TrackDip: a multi-scale processing of dipmeter data. Method, tests, and field example for 3D description of gravity-driven deformations in the Eocene foreland basin of Ainsa, Spain

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Abstract

This paper presents TrackDip, a new method for dipmeter data processing. This method selects, localizes and measures significant tilts from the comparison at various scales of the changes of orientation of sedimentary beddings. We tested this method on simple cases (unconformity, gradual tilt, successive tilts, without and with additional random noise) and on a field example, along three sections in the Eocene Sobrarbe delta, Ainsa foreland basin, northern Spain. For synthetic data sets, the method clearly identifies and measures the introduced tilts.

On the field, sedimentary and tectonic structures, especially three main syn-sedimentary sliding surfaces (S1 to S3), were successfully identified from processed dipmeter data. The tilt axis are mainly trending N-S in sandstones, associated to westward transport of sediments. The sliding surfaces S1 and S3 correspond to E-W-trending tilt axis, tentatively correlated either to the flexural subsidence of the basin, or to anticline growth during sedimentation south of the studied area. Combination of these sedimentary and tectonic directions results in a NE-SW striking submarine slope, which locally controls the gravity-driven deformations, especially on the S2 sliding surface. Finally, NNW-SSE-trending tilts above the uppermost S3 sliding surface are interpreted as the result of infilling on the side of the scar produced by sliding.

Keywords : dipmeter, tilt, processing, gravity-driven deformations, foreland basin

1. Introduction

Among downhole logging tools, dipmeters represent a class of tools designed to measure the orientation, i.e. both dip angles and azimuth (dip direction) of bedding planes intersected by a borehole. While boreholes are one-dimensional, dipmeter data allow to describe 3-D geometry of sedimentary units, and bring crucial information on all processes involving changes of orientation in sediment bedding, such as deposition in flows (e.g. Luthi and Banavar, 1988 ; Höcker et al., 1990 ; Donselaar and Schmidt, 2005), deformations during and after sedimentation (e.g. Hesthammer and Fossen, 1998), differential subsidence. It is noteworthy that these changes of orientation occur at various space and time scales, and that their effects are merged in a single record.

The word dipmeter refers only to dip measurements, and little has been done to fully use these three-dimensional measurements. The classical tadpole graphical display of dip and azimuth as a function of depth (Serra, 1989) underlines the dip variations, but azimuth variations are difficult to read. Interpretations often used mainly dip variations (Gilreath, 1987 ; Serra, 1989). Similarly, processing methods either used only dip measurements (Hurley, 1994), or are restricted to a given scale (point to point analysis : Berg, 1998 ; folded structures : Bengtson, 1981).

In this article, we present a new method, named TrackDip, to process bedding attitudes from outcrops in order to identify at various scales the successive changes of orientations in a sedimentary section. While designed to process dipmeter logging data, we tested this method on a field example, in the Eocene foreland basin of Ainsa (Spain). This test allows a direct comparison between interpretations from dipmeter analysis and outcrop exposures.

2. TrackDip processing of dipmeter data

The processing methodology described herein is a formalized version of the empirical process used by Basile (2000) on logging data. Annexes 1 to 4 present the successive stages of processing for the three datasets analysed in this paper.

The dipmeter data set consists in a series of measurements of elevation, azimuth and dip angle of stratigraphic bedding surfaces (e.g. Annex 1). Processing is based on a multi-spectral analysis, where the changes of bedding attitude are compared and tracked between various scales (Figure 1). It is important to note that this processing only applies to stratigraphic surfaces. It has no meaning if sedimentary beddings and tectonic structures are mixed in the dipmeter data set.

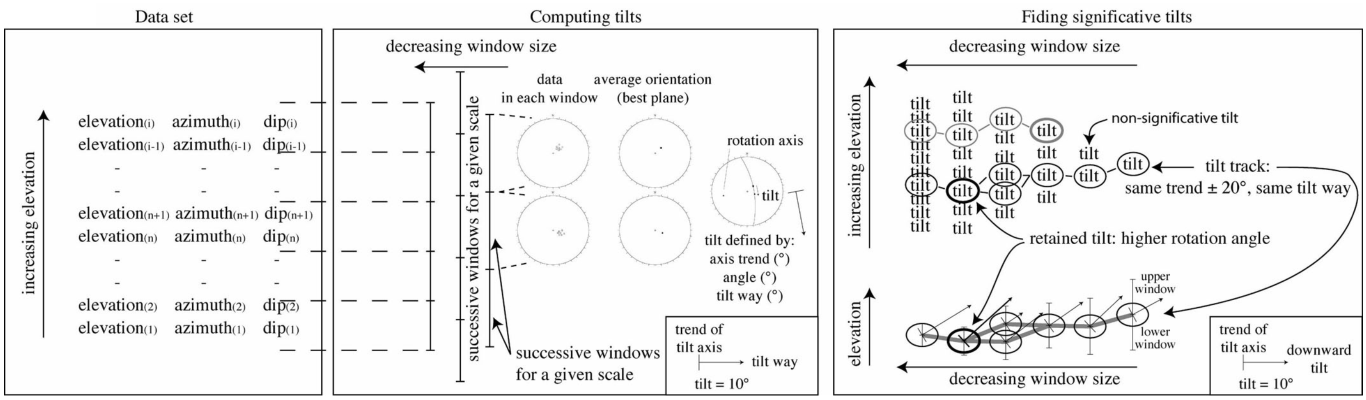


Figure 1 : Successive steps of dipmetry processing : data set, computing tilts as a function of scale, identifying significant tilts. Stereographic projections : Wulff nets, lower hemisphere. See text for details. Tilts and tracked tilts are shown as in Figures 3 to 9 and 15 to 17 ; the tilt way arrow indicates the downward tilt.

2.1 Investigated windows

A given scale (e.g. 1 m) defines a window size (1 m in this example). For this given scale the data set is cut in successive windows, positioned symmetrically by reference to the centre of the depth interval (e.g. eleven meter-scale windows from 10 to 21 m for a 10.25 - 20.75 m interval). The positions of windows depend only on the scale and on the position of the first and last data. The upper and lower limit of each window define its position.

2.2 Best planes

In each window, we compute a best plane, i.e. an average of the bedding plane orientations contained in this window. Most of the time, this best plane has no geological meaning, as it may average data from distinct populations like above and below an unconformity. For the smaller scales, there is only one data in most windows, and we use this data as the best plane.

2.3 Tilts

A change of attitude (tilt) is then calculated between two successive and adjacent windows (Figure 1, Annex 2). As for the best planes, computed tilts may not have a geological meaning, as they may mix together several independent geological tilts. Each tilt is defined by the trend of the rotation axis, a rotation angle, and a tilt way (Annex 2) ; it is located by the position of the limit between the two consecutive windows. Defining the rotation axis only by their trends restricts this processing to moderately dipping (less than 45°) sections. The tilt way is defined by the azimuth of the lower plane when both upper and lower planes are rotated to bring the upper one horizontal (Figure 2A). It is important to notice that the tilt way does not indicate absolute but relative tilt, by reference to the upper layer. For example, depending on the dip of the upper layer at the time of sedimentation, a similar tilt way towards East can be interpreted either as a dune dipping East below an horizontal surface, or as an horizontal surface below a dipping West prograding clinoform (Figure 2B).

2.4 Tracking rotations

Investigation scales vary from the smallest depth-interval between two data (often at centimetre scale), up to the size of the depth interval for the whole data set (few tens to hundred meters). In order to make the comparison between the various scales easier, we used an arbitrary fixed ratio of $10^{0.1}$ between consecutive scales, investigating ten scales between 10 centimetres and 1 meter, between 1 meter and 10 meter, etc. Computing the tilts between all the adjacent windows for all investigation scales results in matrixes of rotation axis trend, rotation angle, and tilt way as a function of depth and window size (Figure 1, Annex 2). Tracking rotations is a process that identifies the most significant tilts in these matrixes.

Whatever the scale and the geological process are, every tilt can be considered either as a sudden tilt (change of orientation between two data) or as a gradual tilt around a single rotation axis between more than two data. In both cases, we call this tilt ‘event’, and ‘noise’ the other changes of orientation, that can be instrumental errors or the adjacent geological event. This terminology applies to each tilt, which is an event by itself, and a noise for other tilts. A random noise has a random distribution around an average value, and the best plane does not vary significantly from this average value when the window size increases.

2.4.1 Sudden tilt

2.4.1.1 Best measurement

For a sudden tilt, the event is correctly measured when it fits the boundary between two windows. For this position and for random noise, the best measurement of the tilt can be obtained for the widest windows, which represent the best average. If the noise is not random, and results from neighbouring events, then the best measurement of the tilt is obtained for the widest windows that do not cover the adjacent events.

2.4.1.2 Best location

In fact the main problem is that the position of the event is not known in advance. If a window straddles this event, it contains data from the two groups separated by the tilt. Its best plane differs from these two groups, but the tilt between this best plane and each of the two groups has an axis similar to the searched tilt, but smaller rotation angle. Consequently, the event may be identified by constant parameters (axis trend, way) for various and successive window sizes. As the rotation angle increases when the mixing between the two groups decreases, the best location is obtained for the highest rotation angle.

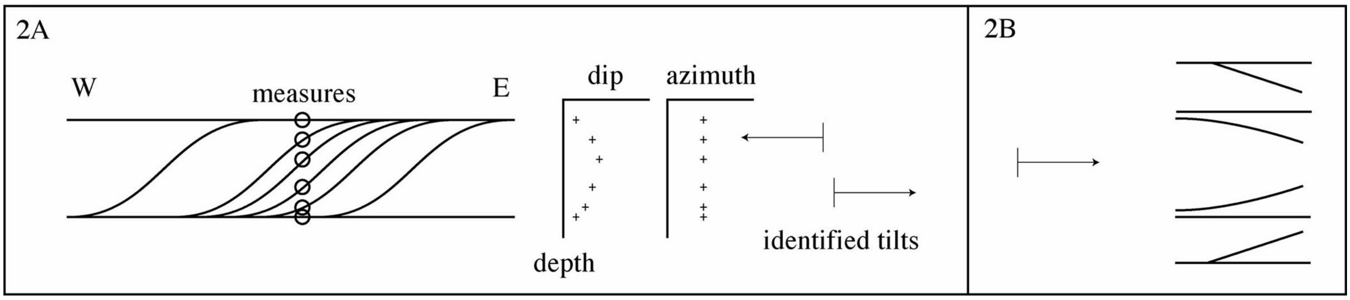


Figure 2. A : a single sedimentary structure may be identified by two tilts with opposite tilt ways. Tilt symbol as in Figure 3 to 9 and 15 to 17. B : various interpretations of the same tilt : the tilt way does not give indications on sedimentary surfaces intersection ; the same tilt way can correspond either to downlap or toplap, but also to curved surfaces.

2.4.2 Gradual tilt

Gradual tilt can be considered as a succession of adjacent sudden tilts with similar rotation axis and ways. In this case, the best location match the whole set of adjacent windows, at the scale where the sum of rotation angles is maximum. Then the best measurement consists in the average rotation axis and ways, and rotation angle is the sum of rotation angles.

2.4.3 Process

The significant events are tracked from the largest to the smallest window sizes, searching rotations characterized by significant rotation angles (> 3°), similar axis trend and similar tilt way in the same depth intervals. We consider trends to be similar at ± 20°, but this value, as the rotation angle cut-off, can be modified (see below § 3). We retain only as significant events the rotations that can be tracked in at least three successive window sizes without similar data sets (Annex 3). For a given scale, when two successive tilts (i.e. three successive windows) have similar axis trend and tilt way, we define the tilt by the average trend and by the sum of tilt angles. Among all the rotations tracking a single event for various window sizes, we retain arbitrary the higher rotation angle (Annex 4).

3. Methodological tests (Table 1)

In this section, we present few tests of TrackDip performed on synthetic data sets. Each data set contains 200 measurements in a 100 m-thick section. The depth of each point has been randomly distributed within this section.

3.1 Test1 (Figure 3)

In this test, a single unconformity occurs between 120.28 and 121.16 m. The unconformity represents a 7.78° tilt around a rotation axis trending N53.6°. In this example, TrackDip perfectly localizes and measures the event (Table 1). As expected, the maximum rotation angle is found where the boundary between two windows fits the depth of the unconformity. As there are no other changes in orientation, the unconformity is the only event identified by TrackDip.

3.2 Test2 (Figure 4)

Test2 is similar to Test1, but with a random change of orientation on each data. Dips are randomly modified ± 4°, and azimuths are randomly modified ± 4°/sin(dip). These changes approximate a random distribution around an average orientation. The resulting tilts between adjacent data that belongs to the same group (above or below the unconformity) are smaller than 12°. As for Test1, TrackDip localizes and measures the unconformity, with a small difference for the rotation angle, and a very small difference for the rotation axis trend (Table 1). Other events are also tracked for smaller window sizes, and for smaller scale ranges. These events are related to the most important random changes of orientation, like the one at 142 m (Figure 4). They are tracked for small window sizes, when windows contain only few data (usually less than seven). Around 154.5 m, a double event is tracked, with similar rotation axis and angle, but with opposite ways (Figure 4). This double event can be related to a single data located between them, which is significantly different from the neighbouring data.

The same Test2 has been processed using various cut-offs (Figure 4). Decreasing the minimum rotation angle from 4° to 2° does not change the tracking of the unconformity, but tracks an increasing number of smaller events, almost all for small windows containing less than seven data. On the contrary, reducing the allowed change of rotation axis from ± 30° to ± 10° reduces the number of tracked events, and the continuity of tracking. For example, for a ± 10° change, the unconformity is not identified by a single track, but by two tracks at the same depth but for different window scales (Table 1).

3.3 Test3 and Test 4 (Figures 5 and 6)

Test3 and Test4 are also similar to Test1 but dips are randomly modified ± 8° and ± 12°, respectively. Azimuths are randomly modified ± 8°/sin(dip) and ± 12°/sin(dip), respectively. This increases the changes of orientations related to the random distribution to more than 20° and 30°, respectively. Consequently, an increasing number of tilts are tracked, and they are not restricted to small window sizes (Fig. 6). Increasing the random noise also moves the identification of the unconformity to wider windows, and decreases the precision of both localization and measurement (Table 1).

3.4 Test5 (Figure 7)

In this test, we introduced a gradual tilt, then data were randomly modified (Table 1). The gradual tilt is well localized and measured by TrackDip, but for wider windows than the interval where the tilt occurs (Table 1), because the best computation requires the comparison of

			Introduced				Cut-offs		Observed			
	Figure	Type of tilt	Depth (m)	Angle (°)	Axis (°)	Random noise	Tilt angle (°)	Axis trend (°)	Depth (m)	Window scale (m)	Angle (°)	Axis (°)
Test1	3	Sudden	120.72	7.78	53.6	0	4	30	120.76	2	7.78	53.6
Test2	4	Sudden	120.72	7.78	53.6	± 4°	3	20	120.8	2.52	9.15	54.9
							3	10	119.95 120.7	19.95 0.79	7.54 8.6	55.5 48
Test3	5	Sudden	120.72	7.78	53.6	± 8°	3	20	119.76	19.95	8.64	51.5
Test4	6	Sudden	120.72	7.78	53.6	± 12°	3	20	118 (94.22-141.77)	15.85	8.24	85.8
Test5	7	Gradual	169.7-173.7	15.69	94.9	± 4°	3	20	171.77 (162.31-181.24)	6.31	15.56	87.2
Test6	8	Sudden	112.8	11	75	0	2	30	112.8	0.398	11	74.8
		Gradual	124.87-131.25	15	348	0			127.6 (122.6-132.6)	2.512	12.88	351.93
		Gradual	131.25-136.16	15	348	0			133.85 (130.1-137.6)	2.512	11.92	352.2
		Gradual	144.17-154.5	5	240	0			150.2	12.59	3.8	237.8
		Sudden	183.38	17	200	0			166.01 (118.6-203.4) 183.64	31.623 0.631	20.36 15.77	207.15 197.9
Test7	9	Sudden	112.8	11	75	± 4°	2	30	110.48 (98.57-122.4)	7.943	12.7	78.25
		Gradual	124.87-131.25	15	348	± 4°			127.64 (120.13-135.16)	5.012	13.03	341.1
		Gradual	131.25-136.16	15	348	± 4°			133.83 (131.94-135.72)	1.259	12.46	348.95
		Gradual	144.17-154.5	5	240	± 4°			152.71	2.512	3.53	270.9
		Sudden	183.38	17	200	± 4°			166.01 (118.6-203.4) 183.4 (178.66-188.15)	31.623 3.162	19.78 16.7	207 188.5

Table 1: Introduced tilts in tests 1 to 7, and results (observed columns) of TrackDip processing. Random noise applies to dips. In column ‘observed depth’, parentheses indicate the interval where the tilt is measured, when measured in three or four adjacent windows. Otherwise, the interval is the observed depth ± the window scale. See text for comments.

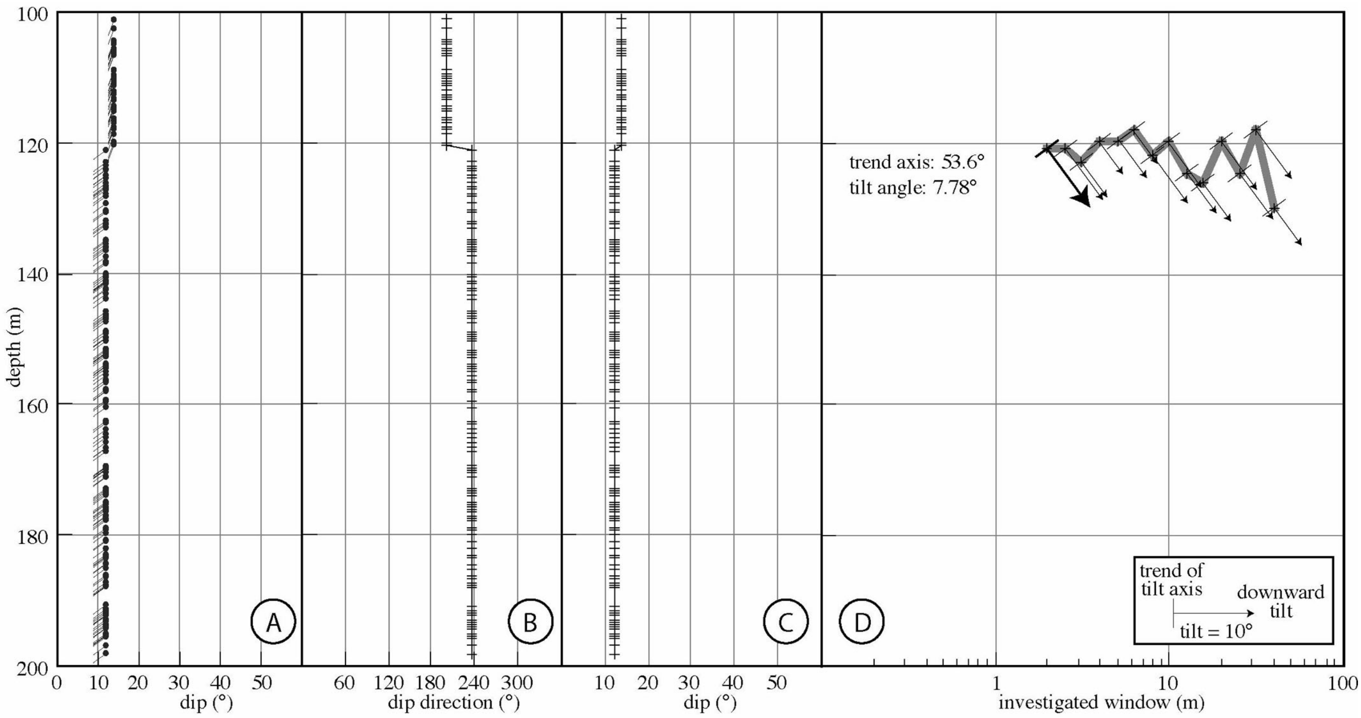


Figure 3: Test1: Display of data and TrackDip results. A : tadpole representation of bedding attitudes. B : azimuth of beds. C : dip of beds. D : TrackDip results : the tracked tilt event (thick grey line) is shown as a function of the investigated window size (logarithmic scale). Tilts are shown for each investigated window ; the bold tilt is retained as the most significant tilt for the tracked event (see text and Figure 1). Cut-offs are 4° for the rotation angle and ± 30° for the rotation axis trend.

data that are outside the tilting interval. When compared to sudden tilts (Figure 4), the gradual tilt is tracked only for wide windows, because differences of orientation between adjacent data are small, and below the angle cut-off for small-size windows. Some of these small-size windows identify parts of the gradual tilt, with similar rotation axis but smaller rotation angles (Figure 7).

3.5 Test6 (Figure 8)

In this test, we introduce several tilts in the same interval. Two of them are sudden tilts, three are gradual tilts (Table 1 and Figure 8). The three deeper tilts have similar rotation axis and the same tilt ways. As for Test1, the sudden tilts are perfectly localized and measured for the smallest window size. However, at large widow sizes, the three deeper tilts merge together in a single and more important tilt, which is not representative of a single event, but of the large-scale effect of three events. As seen for Test5, gradual tilts are best identified at scales larger than the tilt intervals.

3.6 Test7 (Figure 9)

Test7 is similar to Test6, with a random change of orientation on each data. Dips are randomly modified ± 4°, and azimuths are randomly modified ± 4°/sin(dip). As for Test2 compared to Test1, there are numerous tracked events related to the random modification. The five introduced tilts are localized and measured like in Test6, but for wider windows, containing more than 7 data (Table 1).

3.7 Synthesis

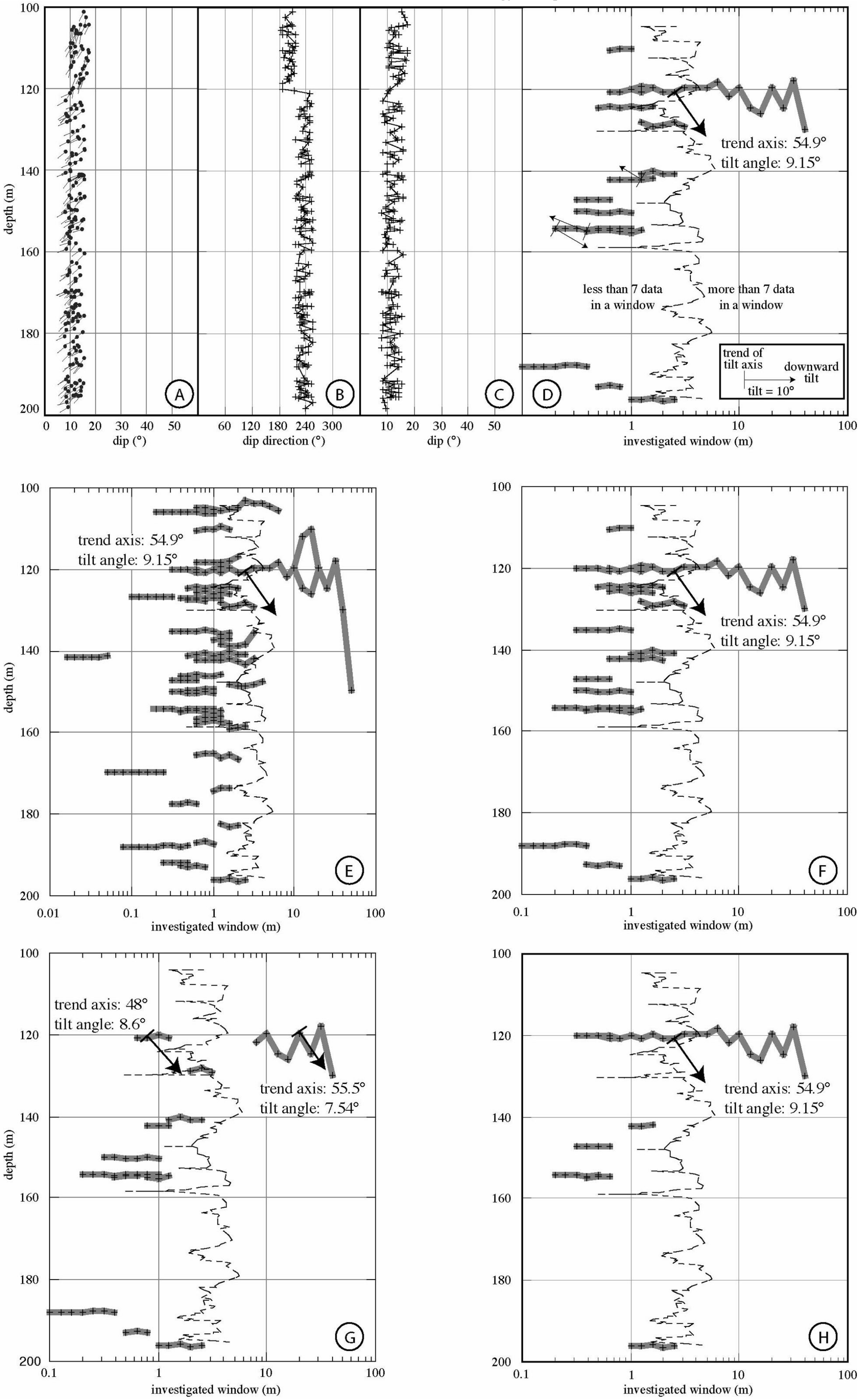
From these tests, it appears that TrackDip correctly identifies, localizes and measures single or multiple tilts, either sudden or gradual. Sudden tilts are easier to detect than gradual tilts, that requires lower cut-offs during the processing. The identification is easier for wide windows ; the localization and measurement occur at narrow windows with no or limited random changes, and at wider windows when the dispersion of orientations increases. However, the size of the windows can not be used as an automatic cut-off : the events tracked for small window sizes exist. In the presented tests, they are related to random dispersion of orientation, but in real studies they can be related to single geological events. Anyway the most significant events always appear as those that can be tracked in a maximum of consecutive scales.

The main limit of TrackDip is that it does not process the superposition of tilts. When similar rotations are closed one to another, they are correctly identified at small window scales, but combined at large window scales. Similarly, superposition of tilts in the same interval may be averaged at large windows. For example, meter-scale syn-sedimentary tilts can be deformed by a later folding at a kilometre-scale. TrackDip can identify both tilts at both scales, but the meter-scale measurements reflect the superposition of the two tilts.

4. Field test

In the following section, we present a field application of TrackDip, to perform several geological tests :

- Efficiency : does this method correctly localise and measure the sedimentary or structural structures observed on the field ?
- Reproducibility : does this method give similar results when performed in similar sections ?



depth (m)
dip (°)
dip direction (°)
investigated window (m)
trend axis: 54.9°
tilt angle: 9.15°
less than 7 data in a window
more than 7 data in a window
trend of tilt axis
downward tilt
tilt = 10°
trend axis: 48°
tilt angle: 8.6°
trend axis: 55.5°
tilt angle: 7.54°
A
B
C
D
E
F
G
H

Figure 4 : Test2: Display of data and TrackDip results. A to D : same legend as for Figure 3. In D, the only tilt shown in bold is the most significant tilt for the tracked event that corresponds to the introduced tilt. The other shown tilts are discussed in the text. The dotted line indicates the size of the windows containing seven data. Cut-offs are 3° for the rotation angle and ± 20° for the rotation axis trend. E to H : same legend as for D, with different cut-offs (E : 2° and ± 30° ; F : 3° and ± 30° ; G : 3° and ± 10° ; H : 4° and ± 30°). See text for comments.

- Predictive ability : is this method able to identify a structure not observed directly in the logged section, but in its vicinity.

4.1 Geological background

The studied sections are located in the Ainsa basin, which represents with Tremp and Jaca basins the Eocene foreland basin south of the Pyrenean belt (Puigdefabregas et al., 1991 ; Figure 10). Lithospheric flexure induced an increasing subsidence towards NorthEast to North-NorthEast. During basin formation and infilling, the development of a thrust ramp (Sierra de Montsec) induced an East-West trending drainage, and the development of the important Sobrarbe delta feeding the Ainsa marine basin from the South East (Figure 10, Dreyer et al., 1999). The propagation of the lateral thrust ramps induced intra-basinal North-South-trending growth anticlines, from East to West, and from the oldest to the youngest : Mediano, Arcusa, Boltana anticlines (Figure 10). These anticlines locally imposed a north-northwestward progradation of the delta. Finally, the Ainsa basin has been unconformably covered by Middle to Upper Eocene continental sediments of Jaca basin (Figure 10).

The studied sections belong to the proximal part of the Sobrarbe delta, at the top of Las Gorgas composite sequence (Dreyer et al., 1999) : the shallower facies are nummulitic limestones, either in situ or resedimented in submarine dunes or sand channels in the delta shoreface ; deeper facies are siltstones and mudstones from the prodelta. In the studied area, the delta front has been affected by large-scale collapses. Dreyer et al. (1999) interpret these collapses as a result of tilting on the flank of a North-South-trending Arcusa growth fold, although they notice that tilting seems to occur towards North-NorthWest. It is noteworthy that the Boltana anticline was not well-developed at the time of deposition of the studied sections, but appeared more recently as a growth fold. Callot et al. (Submitted) identified three sliding surfaces (S1 to S3) in the studied area (Figure 11). S1 and S3 truncate the underlying sediments, with marked angular unconformities (Figures 12 and 13). S1 and S2 are associated to numerous normal faults and clastic dykes that indicate northwestward slides (Callot et al., submitted ; Figure 14). From the orientation of S3 and its vanishing towards north (Figures 11 and 13), a northward slide is postulated for this surface (Callot et al., submitted).

4.2 Measurements

On three outcrops, we systematically measured available and accessible attitudes of beds along three sections on the right bank of Rio Ena, between barrancos Mazana and Solano (Figures 11 to 13). The measurements were reported on a vertical log. Elevations are given by reference to the first measure of the section. The error on the difference of depth between two consecutive measures is estimated to 20%. As we measured all observed bed surfaces, measurements are closer in sandstones where individual strata are centimetre- to decimetre-thick, than in mudstones where clear beddings are sparse, and often

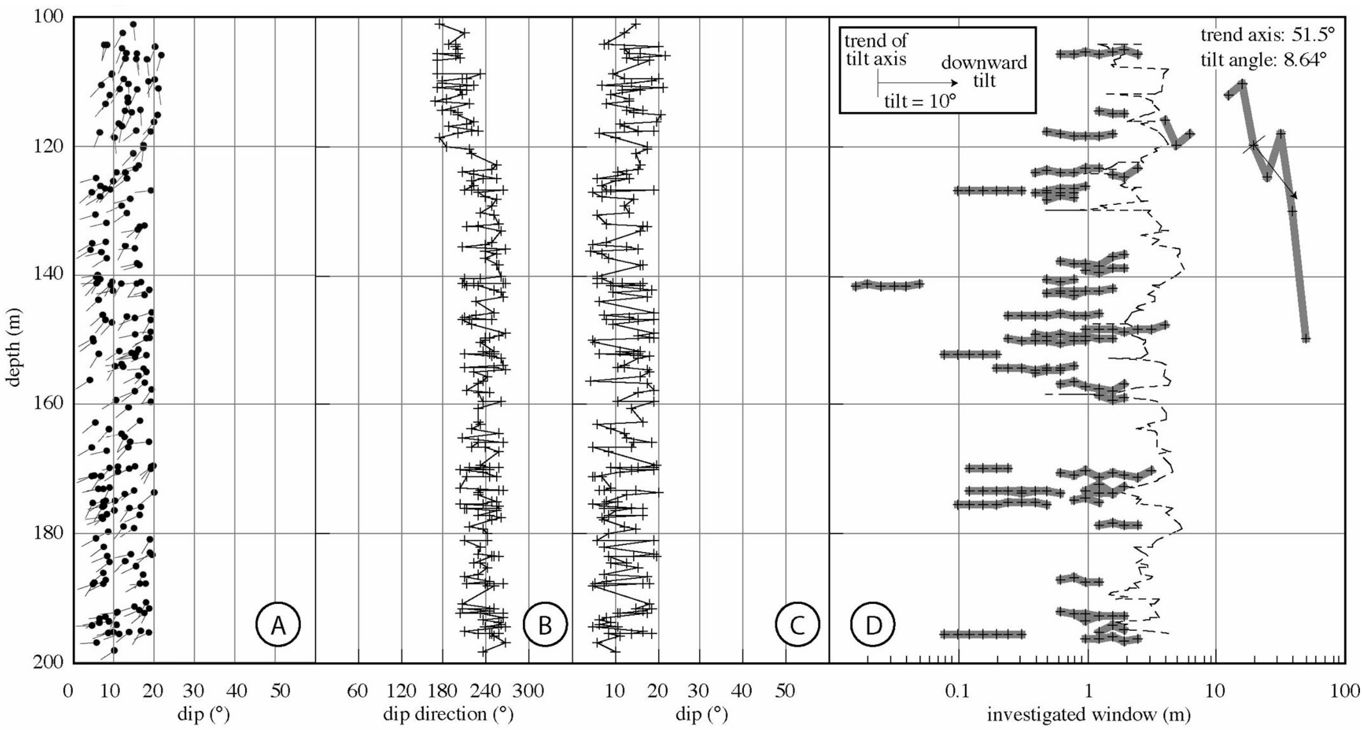


Figure 5 : Test3: Display of data and TrackDip results. Same legend as for Figure 4. Cut-offs are 3° for the rotation angle and ± 20° for the rotation axis trend. See text for comments.

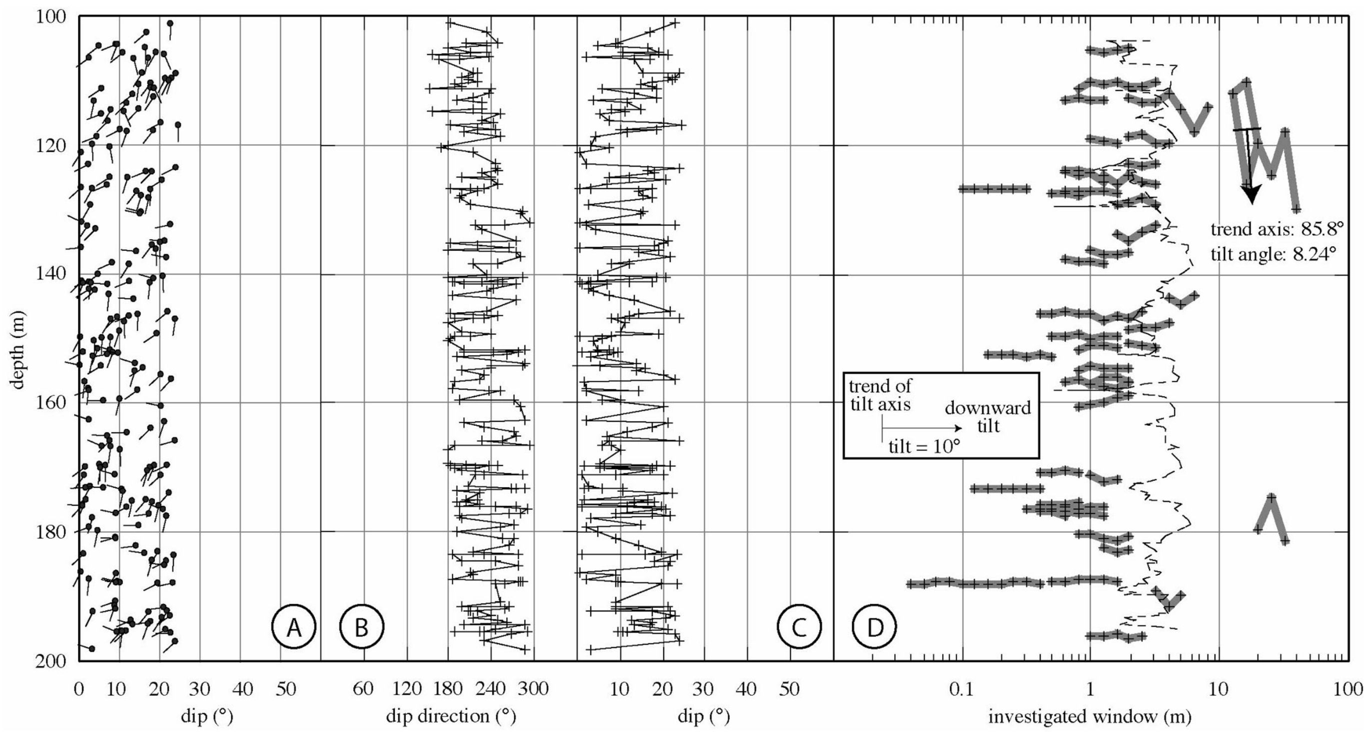


Figure 6 : Test4: Display of data and TrackDip results. Same legend as for Figure 4. Cut-offs are 3° for the rotation angle and ± 20° for the rotation axis trend. See text for comments.

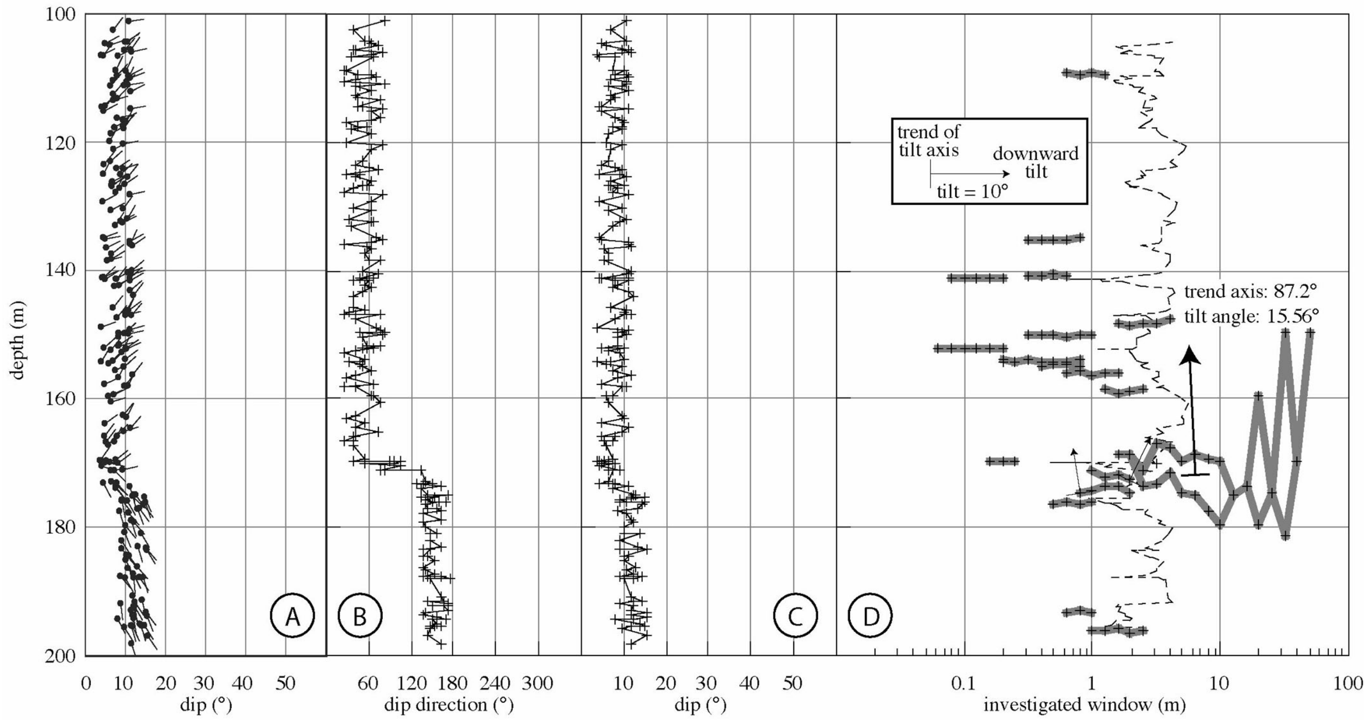


Figure 7 : Test5: Display of data and TrackDip results. Same legend as for Figure 4. Cut-offs are 3° for the rotation angle and ± 20° for the rotation axis trend. See text for comments.

separated by several meters. Consequently, sampling rate is not constant, and the changes of attitude have to be studied at various scales.

We repeated some measurements ten times to estimate instrumental errors on azimuths and dips. The average standard deviations are 2.5° on azimuth measurements (between 1.25° and 3.34°), and 3.7° on dip measurements (between 2.13° and 5.09°). These errors are clearly smaller than the observed variations of azimuths (more than 30°) and dips (more than 40°) (Figures 15 to 17).

Section I (Figure 15) is a 74 m-high E-W section located just North of barranco Solano (Figure 11). The two other Sections are located 400 m North of Section I (Figure 11), and define two perpendicular sections across a same hill, N-S and E-W for Sections II and III, respectively (Figures 16 and 17). These two sections are close one to another, and several strata (A to D in Figures 16 and 17) can be

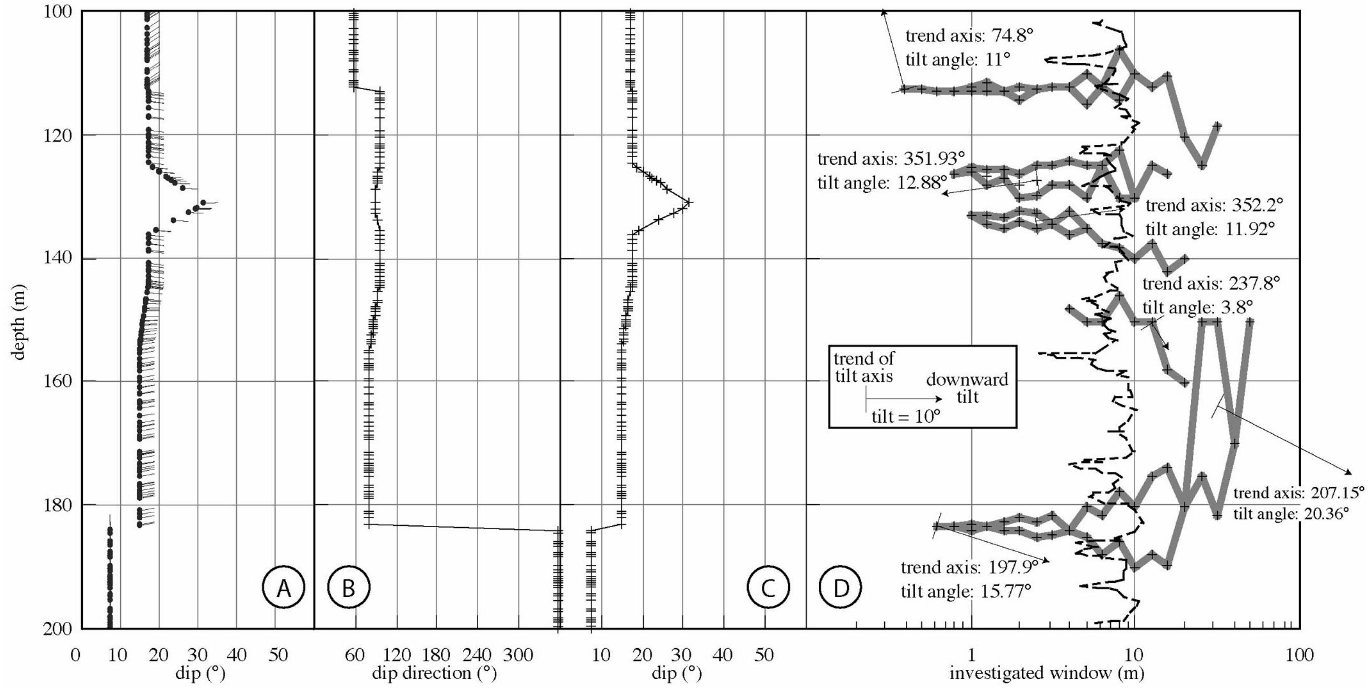


Figure 8 : Test6: Display of data and TrackDip results. Same legend as for Figure 4. Cut-offs are 2° for the rotation angle and ± 30° for the rotation axis trend. See text for comments.

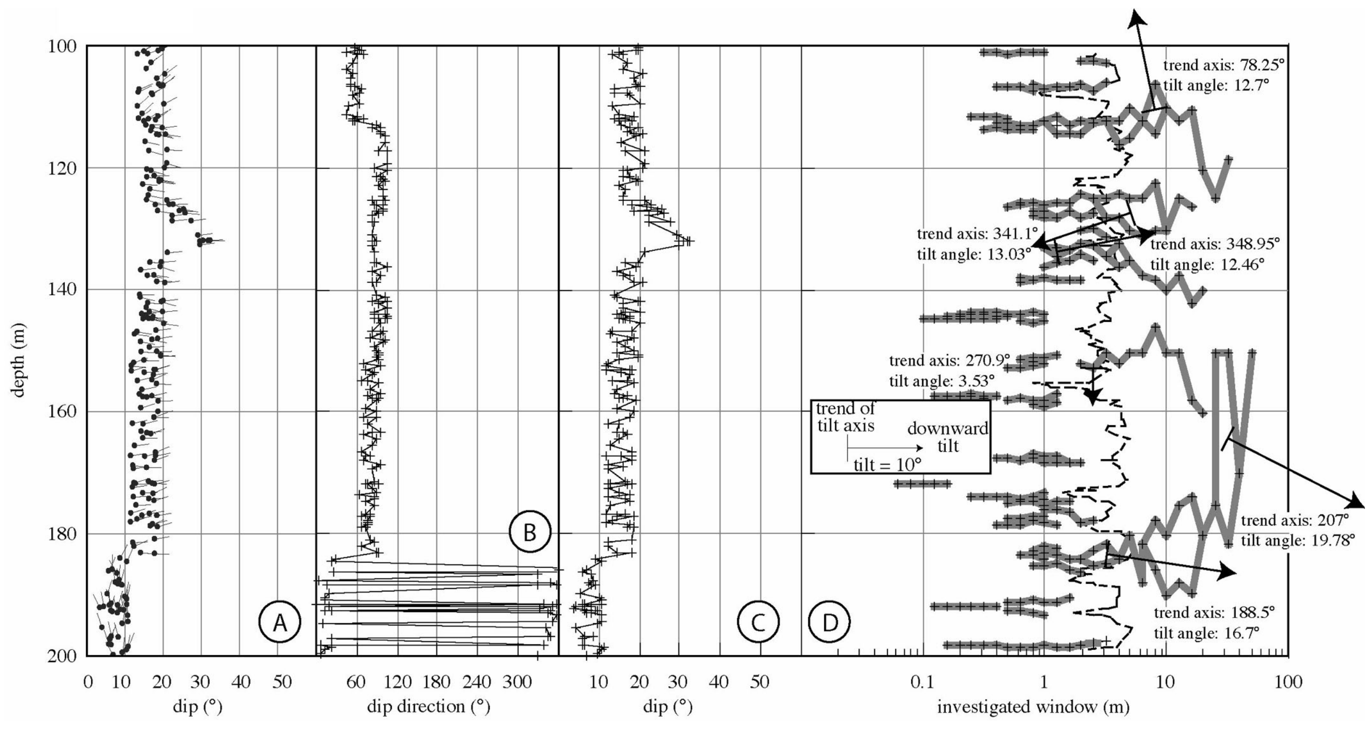


Figure 9 : Test7: Display of data and TrackDip results. Same legend as for Figure 4. Cut-offs are 2° for the rotation angle and ± 30° for the rotation axis trend. See text for comments.

correlated. The two sections share the same measurements for strata E at the top of the hill. Above strata C, the upper parts of Sections II and III are lateral equivalents of the first ten meters above the S3 unconformity located at 47.5 m in Section I.

In these three sections or in their vicinity, we observed several structures associated to changes of bed attitude (Figures 15 to 17): sedimentary structures are mainly cross-bedding in sandstones ; syn-sedimentary or syn-diagenetic normal faults currently occur in mudstones. Some of these structures appear in three dimensions as decimetre- to meter-scale sliding scars. In Sections II and III, sedimentary dikes were also observed at the base of A sandstones, along S2 sliding surface (Figure 14). Finally, the large-scale changes of attitude are often associated to pinching-out beds, some of them clearly associated to the main unconformities S1 and S3 identified in the area (Callot et al., submitted) (Figures 12 and 13).

4.3 Results of TrackDip process

4.3.1 Artefacts

- The right parts of Figures 15 to 17 display the tilting events computed by TrackDip from the variations of bed attitude in Sections I to III, respectively (Annexes 3 and 4).

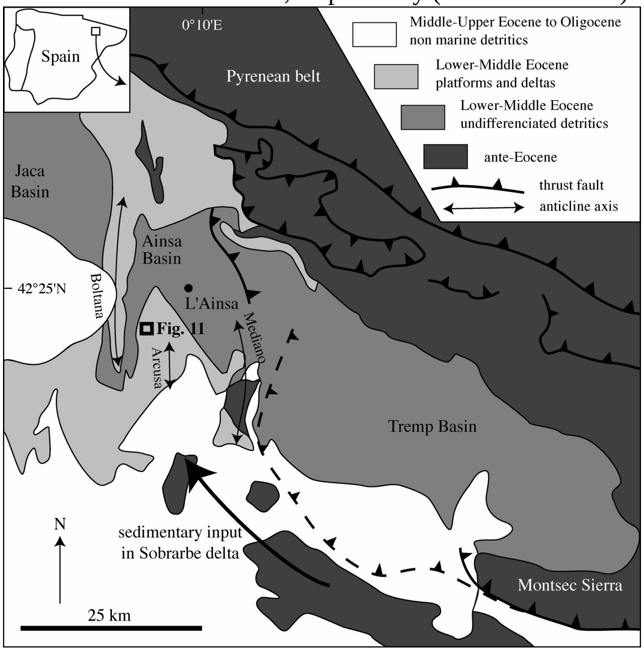


Figure 10 : Simplified geological map of the central part of the spanish Eocene foreland basin (modified from Fernández Bellon, 2004). The box locates Figure 11.

We refer to these rotations by the Section number followed by the tilt number (e.g. I-7). In the three cases, the characteristic scales of identified rotations are of course constrained by the distance between consecutive measurements : in mudstones where bedding is sparse, characteristic scales vary from 1 to 10 meter, while they can be as small as 10 cm in sandstones. With this restriction, the dipmeter logs appear as a succession of tilts at various scales. However, some of these tilts are clearly related one to another. We exemplify these cases in Section I (Figure 15), but they were observed similarly in the two other sections :

- In some cases like I-69 and I-152 (elevation 7 m), or I-193 and I-229 (elevation 24 m), TrackDip identifies two similar rotations at different scales but for the same elevations. As in Test2 (see above), this indicates an interruption of tilt tracking, due to too restrictive cut-offs. However, these two rotations correspond to a single tilt event which location is best indicated by the smallest window size.

- A peculiar feature occurs when the tilt axis progressively rotates when the window size decreases, such as for I-7, I-13 and I-48 (elevation 24 to 30 m). This indicates a progressive change of preferred orientation with scale : smallest scales (< 1 m) correspond to N-S trending rotation, while large scales correspond to E-W trending rotation. As in Test6 or Test7, this change occurs because large windows merge several individual tilts that occur at smaller scales.

4.3.2 Section I : various scales

Taking apart the variations associated to these artefacts, the tilts of Section I can be sorted as follow (Figure 15) :

At scales larger than 25 m, two perpendicular tilts are observed. Both tilt ways indicate eastward dips in the lower part of the section, consistent with the decrease of dip with elevation in the section. However, tilt trends differ between the lower part of the section (I-1, trending N30°) and the upper one (I-2, trending N140°). I-2 rotation indicates a progressive tilt from 46 to 76 m, which is better defined at a 10-meters scale.

At 10-meters scale, we observe three successive tilts : below 25 m, two tilts (I-9 and I-3) with similar trend (N160°) but opposite ways ; in the 20-35 m-interval, southward tilt I-7 is E-W-trending ; finally in the upper part of the Section (above 35 m), N140°-trending tilts occur with alternative tilt ways (I-10, I-6, I-2).

At smaller scales, the variability of the intervals between consecutive measurements precludes a description of consecutive tilts. However, we observe only few preferred tilt orientations : in the lowest part of the Section, two consecutive and opposite tilts (I-15 and I-124) trend NE-SW at few meters to few decimetres scales. Elsewhere, N-S trending opposite tilts prevail at the smallest scales, including less than 10 cm-scales. Most of

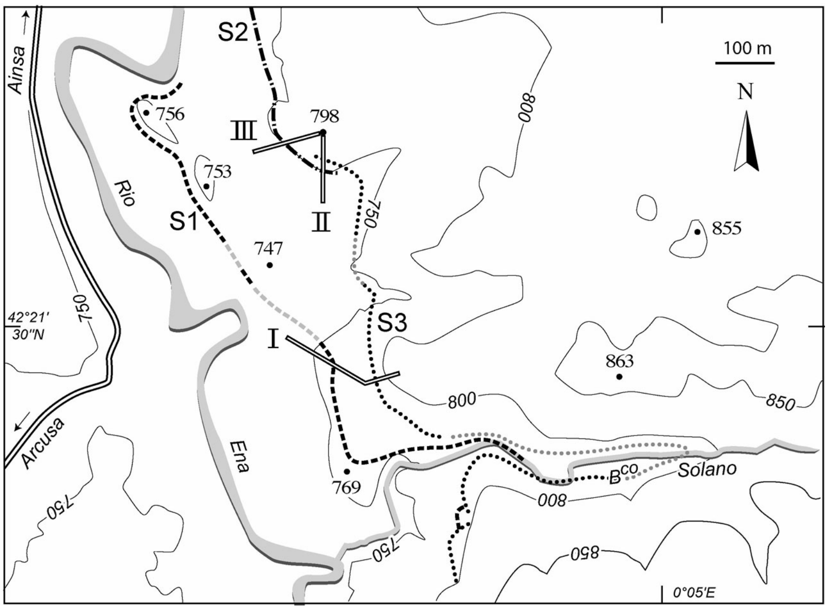


Figure 11 : Location of studied Sections I to III (Figures 12, 13, 15 to 17) and main sliding structures (S1 to S3, according to Callot et al., submitted). S1 and S3 in grey where hidden. Elevation in meters.

Figure 12 : Section I outcrop, located on Figure 11. Dipmeter measurements follow the dashed line ; the lowest part of the section is not visible on this picture. The main sliding surfaces S1 and S3 are underlined, together with stratigraphic markers α and β (Figure 15). View to the south east.

Figure 13 : Sections II and III outcrop, located on Figure 11. Dipmeter measurements follow the dashed lines. The main sliding surfaces S2 and S3 are underlined, together with some stratigraphic markers (A, C to E, Figures 16 and 17). Notice the changes of thickness between D and E. View to the north, Boltana anticline in the background.

these rotations are first (from bottom to top) eastward tilts, then westward (e.g. I-34, I-152 and I-69 followed upward by I-43, I-9 and I-27). E-W trending tilt axes appear in the 25 to 48 m interval (e.g. I-63 at 41 m or I-22 at 47 m). Finally, many successive tilts indicate similar rotation axis and angle, but opposite tilt ways (e.g. I-15 and I-124, elevation 2 to 5 m ; I-27 and I-3, elevation 12 to 15 m ; I-10 and I-6, elevation 38 to 46 m). These pairs indicate that two sub-parallel beds enclose oblique beds, as cross-bedding between horizontal beddings (Figure 2A).

4.3.3 Section I : comparison with field observations

At all scales, several identified tilts perfectly fit the structures observed on the field :

In the sandstones, the observed cross-bedding (23, 24, 48 m in Section I) are dune-like structures, with oblique beds dipping East between paleo-horizontal surfaces (e.g. Figure 18). These structures fit the identified N-S trending tilts at the same elevations (I-143, I-193 and I-229, I-223, I-204, I-212). Tilts with similar trends are also identified in other sandstone beds where cross-bedding was not directly observed (I-152, I-69, I-43, I-9 in the 7-10 m interval ; I-245 and I-157 in the 25-27 m interval). All these observations indicate a westward transport of detritic particles in this part of the delta.

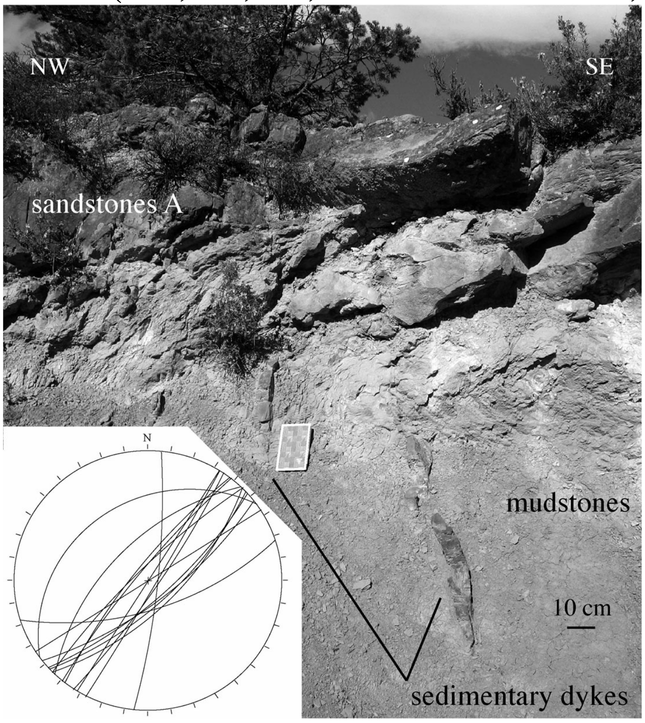


Figure 14 : Sedimentary dykes in the mudstones below sandstones A and sliding surface S2 (located in Sections II and III, Figures 16 and 17). Stereographic projection (Wulff net, lower hemisphere) of the dykes measured in the same stratigraphic layer. Notebook (17.5 x 11.5 cm) for scale. Location Figure 13.

At a larger scale, nummulitic limestones are systematically associated to NNW-SSE trending rotations with an ENE tilt way (I-3 at 14 m, I-2 in the uppermost part of Section I).

Finally, pinching out and unconformities are well-identified : S1 and S3 sliding surfaces are similarly identified by E-W-trending tilts (I-49 and I-109, and I-22, respectively), with the underlying beds truncated by a north-dipping unconformity. The same E-W-trending tilt (I-63 at 41 m) is observed associated to pinching out at a smaller scale between the two surfaces. However, small-scale and large-scale pinching out overlying S1 and S3 are mainly characterized by similar NW-SE-trending tilts : tilt I-10 fits the 38-40 m pinching out associated to S1 unconformity, with similar NW-SE trend and tilt way as for rotations I-3 (10-20 m) and I-2 (46-74 m), which represents the large-scale wedge overlying S3 unconformity (Figure 12). I-9 (10 m) and I-6 (45 m) share the same NW-SE axis but with an opposite tilt way.

On the contrary relationships between identified tilts and small-scale paleo-scars are not obvious : the trends of rotation axis do not clearly fit the orientation of sliding surfaces (Figure 15) : I-34 at 6 m trends N25° while the sliding surfaces strike N125° to N-S ; I-72 at 18 m trends N145° while the sliding surfaces strike N-S and N75°. At 24 m, the sliding surfaces strike N-S, parallel to many N-S trending rotations that can also be attributed to cross-bedding. At 37 m, I-101 trends N-S as sliding surfaces observed laterally.

4.3.4 Sections II and III

In lower parts of Sections II and III (Figures 16 and 17), the large scales (> 7 m) indicate tilts trending NE-SW (II-8 and II-12) and N-S (III-11, III-1 and III-12), respectively. Similar NW-SE-trending tilts occur in the upper parts of both sections (II-13, II-15, II-3 ; III-13, III-8, III-5).

As in Section I, numerous structures observed on the field are directly identified by significant tilts. In the sandstones, tilts in the observed cross-bedding are still trending N-S (III-72 and III-141, III-41 and III-90 in the 11-15 m interval) or NNW-SSE (E strata in Sections II and III). Several tilts fit the location and orientation of the observed small-scale paleo-scars (III-67, III-44 and III-13, III-8 at 22, 26 and 37 m, respectively) or normal faults (III-53 at 1 m), while others (II-15 and II-29, II-24 at 30 and 34 m) are oblique or perpendicular to the orientation of paleo-scars. The sedimentary dykes striking N40° (Figure 14) that underlie S2 surface are also well-recorded in both sections (II-44 ; III-26, III-71 and III-88). Finally, the unconformities located at 9 and 11 m (S3) in Section II correspond to E-W-trending tilts (II-45, II-22 and II-37, II-27 and II-38).

As the same data set has been used in the uppermost part of Sections II and III (strata E), it represents a good test to investigate how the change of position of the investigated windows (which is linked to the depth frame) influences the identification of significant tilts : because the position of the investigated windows differs in the two sections, the tracked tilts are not exactly identical. However, both Sections display a similar succession of tilts, for the same strata, with similar trends, angles and tilt ways. Tilt II-119 is the only exception, as it is not observed in Section III, where the change of position of the investigated windows makes the rotation angle too small to be retained.

4.4 Interpretation

Dipmeter processing in the three investigated sections shows that this method is able to detect, localize and measure the sedimentary (cross-bedding, unconformity) or tectonic structures (sliding structure, scar, normal fault) observed on the field at various scales. Obviously, this identification does not allow directly identifying and naming each type of structure, but provides information on the geometry of the structures, and allows discriminating by their orientations structures that can appear comparable on the field. Furthermore, it appears that even when no peculiar structures were observed, the bed attitudes do not vary randomly, but their tilts have preferred orientations that can be ascribed to specific processes identified on other parts of the section. Finally, there are some evidences of reproducibility : in the studied sections we observe similar evolution for two close sections (II and III), especially where the lateral continuity is clear (between strata D and E), but also in the upper part of Section I. Because of shift in the position of investigated windows, there are only slight changes in the results for strata E between Sections II and III.

Of course, dipmetry processing can not be used alone, as it does not provide by itself a geological interpretation of the changes of orientation. But the fact that these changes of orientation are specific to some scales makes the comparison with other data easier. On the field, this method can be time-consuming (for systematic measurements along a section), and lacking precision (because of compass measurements). On the contrary, in

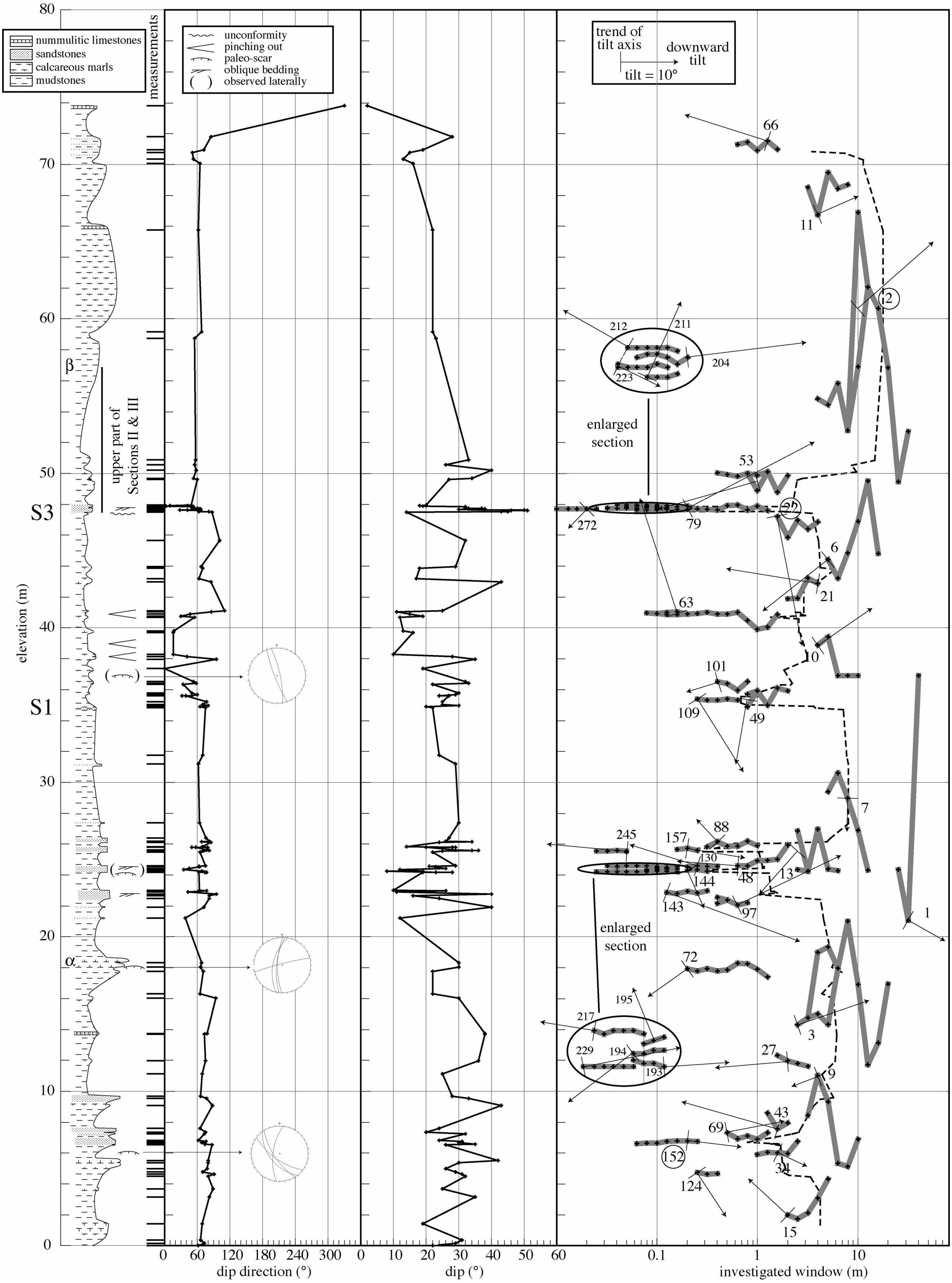


Figure 15 : Sedimentary and dipmeter (dip direction and dip) logs for Section I. Strata α and β and sliding surfaces S1 and S3 are located on Figure 12 ; S1 and S3 are also mapped on Figure 11. The lateral equivalent of the upper part of Sections II (above S3) and III (above layer C)

is located above S3 surface. On the righten part, tilt tracking (grey lines) as a function of investigated window size, and identified significant tilts from processing of dipmeter data (cf. text and Figure 1). The dotted line indicates the size of the windows containing seven data. Tilts are referenced by a number attributed during tracking. They are referenced in the text by the Section number and the tilt number (e.g. I-7) ; circled numbers exemplify the structures drawn in Figure 19. Stereographic projections : Wulff nets, lower hemisphere.

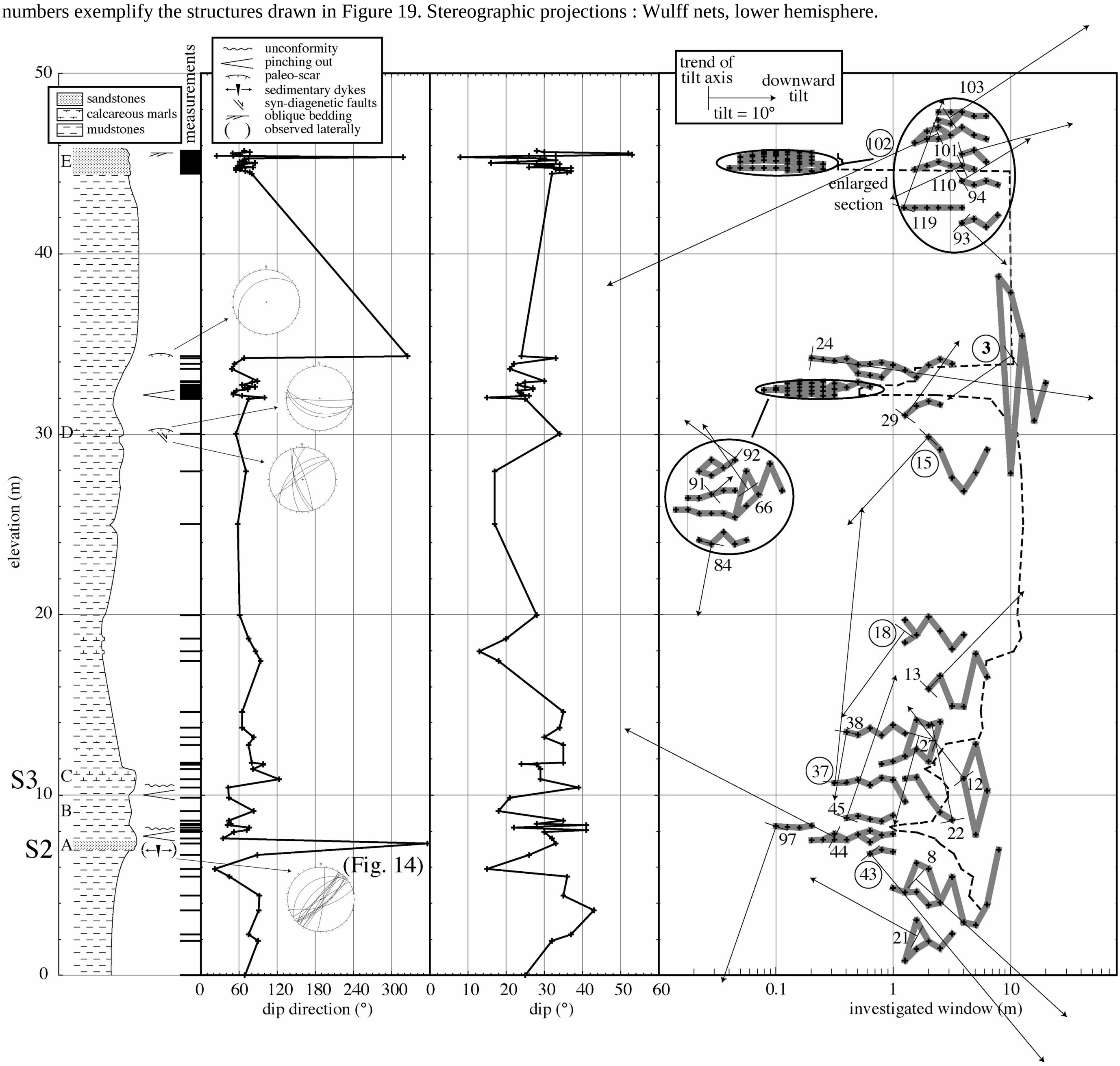


Figure 16 : Section II. A to E are common stratigraphic markers in Sections II and III. Strata A and C to E and sliding surfaces S2 and S3 are located on Figure 13 ; S2 and S3 are also mapped on Figure 11. Same caption as for Figure 15.

drilled borehole, as dipmeter tools provide fast and precise measurements, and moreover allow a systematic survey of bedding attitudes in thicker sedimentary sections, the processing method used herein may be a useful tool to integrate and interpret structural measurements with the other logging records.

For the specific study of the gravity-driven structures in the Sobrarbe delta, the dipmetry results can be interpreted quite simply as a combined effect of sedimentary inputs and large scale tectonic deformations. In the three studied sections as in adjacent places, all evidences, either direct (dunes, cross-bedding, flute-casts) or from dipmetry analysis (N-S-trending tilts in sandstones : I-152, II-102, III-72…), indicate a westward clastic transport. There are only small-scale evidences of N-S-trending gravity-driven sliding (e.g. III-13 and III-44) that were probably controlled by sedimentary overloading. These sediments deposited north of the northern termination of the N-S-trending Arcusa anticline, and west of northern termination of Mediano anticline (Dreyer et al., 1999 ; Figure 19). While detrital displacement was controlled southward by the N-S-trending Mediano and Arcusa anticlines, the westward transport in the studied area probably indicates a change of orientation of the transport network where the Arcusa anticline disappears (Figure 19). An alternative hypothesis can be an independent detrital network coming from the uplifted westernmost part of Tremp basin (Figure 5 in Dreyer et al., 1999), crossing the northern termination of Mediano anticline, and converging with the main delta north of Arcusa anticline (Figure 19).

The large scale tectonic deformations are best indicated by E-W-trending tilt axis, associated to S1 and S3 unconformities in Sections I and II (I-49, I-22 and II-37). These slides can be interpreted either as resulting from the regional northward tilt of the flexural basin, or more probably as the southward uplift of the growing Arcusa anticline (Figure 19). For these two sliding surfaces, the recorded tilts in the studied sections are by several orders larger than the regional tilt that can be induced by folding or foreland basin flexure: these mechanisms can trigger gravity-driven instabilities, inducing locally steep slopes.

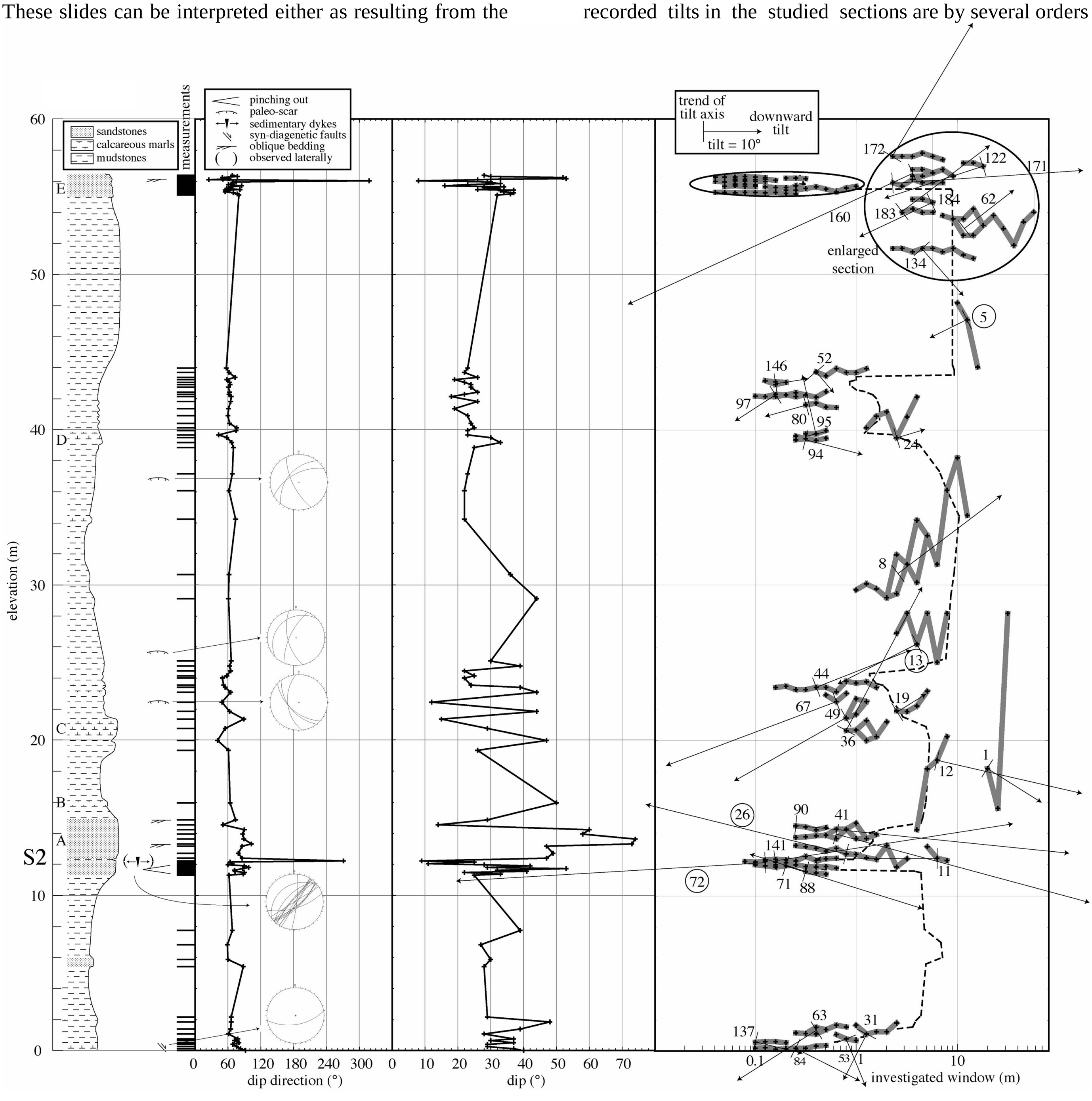


Figure 17 : Section III. A to E are common stratigraphic markers in Sections II and III. Strata A and C to E and sliding surface S2 are located on Figure 13 ; S2 and S3 are also mapped on Figure 11. Same caption as for Figure 15.

A combination of this northward regional tilt with a westward sedimentary transport may generate a NE-SW striking slope at the edge of the delta. This NE-SW direction is mainly recorded by large scale tilts in the lower parts of Sections I and II, but also by extensional structures (normal faults, some small-scale scars, sedimentary dykes), especially associated to sliding surface S2 in Sections II and III (Figure 19).

Finally, it has been observed a significant, while not systematic, difference between tilt axis trend and scar strikes. As proposed by Callot et al. (submitted), this difference may be due to the curvature of slump scar. The arcuate fault may range from perpendicular to the sliding displacement (in the centre) to parallel to it (on the edges). A good example is given by the structures observed at 30 m in Section II (Figure 16), where normal faults accommodates a WNW-ESE extension, but where the overlying sliding scars observed just above strike E-W, and probably represent the edge of an arcuate structure. In this case as at larger scale in the upper part of the three Sections, the associated NNW-SSE-trending tilt axis can represent the structures associated to the edge of NNW-SSE elongated sliding surfaces S1 and S3 (Figure 19).

Furthermore, the large-scale NNW-SSE-trending tilt associated with nummulitic limestones in Section I, and it ENE tilt way can be interpreted as the record of the southwestward progradation of the overlying mudstones, infilling from the side the depressions formed by previous gliding.

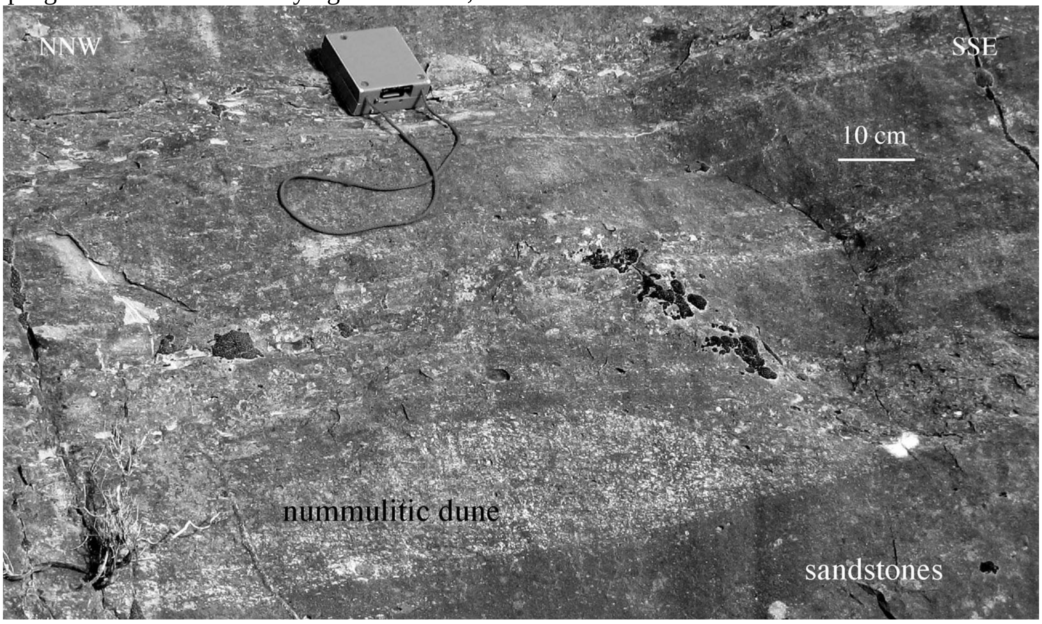


Figure 18 : Submarine dune built by an accumulation of Nummulites (white dots). Lateral equivalent of sandstones, elevation 48 m, Section I (Figure 15). Compass for scale (9 x 10 cm). Location Figure 12.

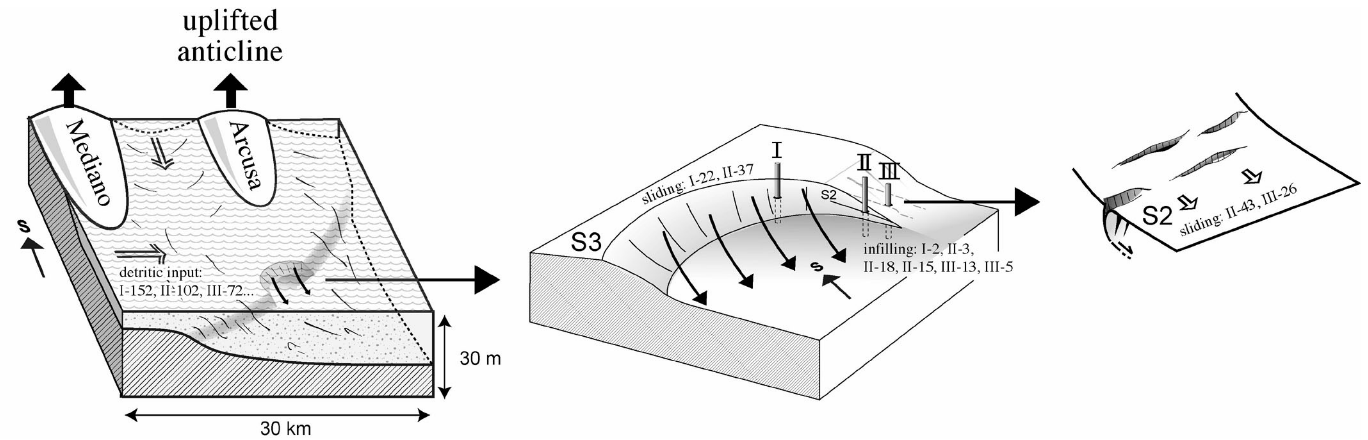


Figure 19 : Schematic 3-D view of the main types of structures observed and deduced from dipmeter logs. Numbers refer to examples of tilts associated to each type of structure.

5. Conclusions

While needing a careful interpretation, the proposed TrackDip processing method of dipmeter data appears to be able to detect, localize and measure the structures independently observed on the field. Because this method integrates several scales, it provides additional information that can not be available from the dipmeter measurements alone. Easier applications of TrackDip can be expected from dipmetry logging in boreholes, even if the geological interpretation will need in every case an integration of all available data. For gravity-driven slides this method can be helpful, as tilt trends can be expected to be close to the perpendicular of the slide directions, while fault strikes can not easily be related to displacements in arcuate structures.

In the studied area, the variations of orientation of the sedimentary beds can be interpreted as resulting from a sedimentary input from east to west, regional tilts towards North triggering the main gravitational instabilities, and a NE-SW local submarine slope.

Acknowledgments

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Annexes

Annex 1 : Dipmetry measures (dip direction, dip, elevation) for Sections I to III.

Annex 2 : Computed tilts for Sections I to III.

Annex 3 : Significant tilts (displayed as paths in Figures 15 to 17) for Sections I to III.

Annex 4 : Retained tilts (displayed in Figures 15 to 17) for Sections I to III.

Section I

dip direction (°)	dip (°)	elevation (m)
62	22	0,00
73	29	0.14
66	31	0.36
69	19	1.43
82	35	3.15
89	25	3.67
80	32	4.5
91	31	4.65
70	29	4.79
78	26	4.99
80	30	5.36
80	42	5.51
87	26	6.54
74	35	6.6
68	30	6.68
76	31	6.75
62	24	6.81
73	32	7.24
75	20	7.36
65	24	7.58
88	43	9.08
77	33	9.53
66	28	9.68
69	25	11.11
75	36	11.97
73	38	13.69
78	38	13.75
94	30	16.04
65	22	16.33
71	22	17.76
66	30	18.05
68	30	18.34
38	12	21.2
72	40	21.92
82	24	22.5
82	16	22.67
95	40	22.75
43	11	22.9
77	26	22.98
64	10	23.03
63	19	24.17
77	28	24.19
74	23	24.2
68	8	24.24
69	19	24.27
35	12	24.35
45	26	24.41
64	23	24.53
63	21	24.58
75	29	24.61
65	22	25.47
70	25	25.56
73	36	25.59
82	34	25.6
77	29	25.61
57	20	25.79
50	28	25.79
79	29	25.82
69	14	25.83
85	24	26.12
68	34	26.15
82	26	26.17
76	27	26.4
64	30	27.39
62	29	31.21
70	24	31.78
75	22	34.82
65	20	34.91
80	30	34.96
70	25	35.05
77	25	35.22
39	27	35.59
32	24	35.6
50	24	35.61
60	29	35.66

Section I (continued)

dip direction (°)	dip (°)	elevation (m)
66	38	47.7
65	33	47.71
64	37	47.72
60	37	47.73
55	33	47.74
50	32	47.78
53	32	47.83
3	19	47.89
42	18	47.9
10	20	47.92
49	20	47.97
60	27	49.62
53	34	49.69
58	40	50.2
55	26	50.56
57	33	50.89
55	23	58.75
68	22	59.18
62	22	65.77
65	16	70.07
53	13	70.36
51	15	70.79
72	19	70.93
85	28	71.8
330	2	73.8

Section II

dip direction (°)	dip (°)	elevation (m)
69	25	0
90	32	1.91
75	37	2.26
91	43	3.62
92	35	4.44
45	36	5.47
22	15	5.89
89	26	6.69
356	33	7.32
35	32	7.6
52	30	7.95
72	41	8.07
76	22	8.19
42	41	8.34
47	28	8.42
44	35	8.58
83	18	9.11
44	21	9.85
43	39	10.41
123	29	10.89
82	29	11.44
98	28	11.68
98	24	11.73
80	35	11.78
75	35	12.79
83	30	13.19
65	34	13.72
65	35	14.63
94	18	17.43
86	13	17.95
75	20	18.68
61	28	19.98
58	17	25,00
71	17	27.95
55	34	30.04
75	25	31.97
100	15	32.05
65	26	32.13
51	24	32.21
52	24	32.33
56	23	32.41
74	27	32.49
69	27	32.57
85	25	32.65
65	23	32.73
81	25	32.88
89	30	32.96
49	21	33.62
53	22	33.92
68	33	34.22
325	24	34.32
80	32	44.46
77	36	44.53
70	37	44.59
55	34	44.65
62	33	44.71
55	37	44.77
82	26	44.8
58	32	44.87
65	28	44.93
66	34	44.99
85	16	45.05
61	23	45.11
68	33	45.18
69	29	45.24
75	30	45.3
318	8	45.36
25	26	45.42
51	33	45.45
62	53	45.52
50	52	45.58
77	30	45.64
68	28	45.7

Section III

dip direction (°)	dip (°)	elevation (m)
92	40	0
83	37	0.13
76	29	0.26
69	29	0.39
80	37	0.52
72	30	0.65
78	37	0.77
61	28	1.08
65	39	1.39
66	48	1.86
66	29	2.17
88	28	5.42
60	30	5.89
59	27	6.81
68	39	7.74
62	25	11.31
88	33	11.39
90	22	11.47
73	41	11.56
72	32	11.64
87	53	11.73
98	29	11.81
90	42	11.89
60	28	11.98
68	11	12.06
64	25	12.15
271	9	12.23
86	47	12.39
79	49	12.7
86	47	13.16
103	73	13.32
89	74	13.63
87	58	13.94
90	60	14.25
51	14	14.56
74	29	14.87
64	50	15.95
61	26	19.36
41	47	19.98
55	29	20.75
89	15	21.37
63	44	21.84
49	12	22.46
65	44	23.08
55	39	23.39
52	24	23.54
50	22	24,00
58	25	24.16
65	22	24.47
63	39	24.78
66	30	25.09
61	44	29.12
62	36	30.66
74	22	34.23
62	22	36.08
68	23	37.17
70	25	38.87
67	33	39.18
58	30	39.49
43	23	39.65
75	23	39.96
76	25	40.11
63	24	40.42
60	23	40.89
61	19	41.35
65	26	41.81
66	18	42.12
62	22	42.28
63	26	42.43
61	24	42.74
64	24	42.9
63	22	43.05
58	19	43.21
73	26	43.36
62	22	43.67

64	30	47.67

Section I

window size (m)	elevation between two consecutive windows (m)	lower window number of measures	average orientation			upper window number of measures	average orientation			tilt angle (°)	tilt axis			tilt way (°)
0.008	24.17	1	153	NE	19	1	167	E	28	10.53	9.9	N	11.7	281
0.008	24.18	1	167	E	28	1	164	E	23	5.16	178.6	N	6.1	90
0.008	25.81	1	169	E	29	1	159	E	14	15.39	177	N	4.4	88
0.008	35.61	1	122	NE	24	1	140	NE	24	7.3	41	NE	23.7	310
0.008	47.54	1	171	E	45	1	153	NE	43	12.63	59.6	NE	42.9	155
0.008	47.58	1	156	NE	46	1	153	NE	51	5.48	137.9	SE	17.8	221
0.008	47.62	1	118	NE	50	1	132	NE	38	15.39	94.5	E	25.5	354
0.008	47.73	1	154	NE	37	1	150	NE	37	2.41	62	NE	37	152
0.008	47.74	1	150	NE	37	1	145	NE	33	4.92	178	N	19.5	94
0.008	47.89	1	93	N	19	1	132	NE	18	12.2	27.2	NE	17.4	296
0.01	24.18	1	153	NE	19	1	167	E	28	10.53	9.9	N	11.7	281
0.01	24.19	1	167	E	28	1	164	E	23	5.16	178.6	N	6.1	90
0.01	25.59	1	163	E	36	1	172	E	34	5.53	102.8	E	32.2	8
0.01	25.79	1	147	NE	20	1	140	NE	28	8.48	125.4	SE	7.6	214
0.01	25.82	1	169	E	29	1	159	E	14	15.39	177	N	4.4	88
0.01	35.6	1	129	NE	27	1	122	NE	24	4.25	167.7	N	17.7	81
0.01	35.61	1	122	NE	24	1	140	NE	24	7.3	41	NE	23.7	310
0.01	47.53	1	171	E	45	1	153	NE	43	12.63	59.6	NE	42.9	155
0.01	47.58	1	156	NE	46	1	153	NE	51	5.48	137.9	SE	17.8	221
0.01	47.62	1	118	NE	50	1	132	NE	38	15.39	94.5	E	25.5	354
0.01	47.71	1	155	NE	33	1	154	NE	37	4.04	147.8	SE	4.7	236
0.01	47.72	1	154	NE	37	1	150	NE	37	2.41	62	NE	37	152
0.01	47.73	1	150	NE	37	1	145	NE	33	4.92	178	N	19.5	94
0.01	47.89	1	93	N	19	1	132	NE	18	12.2	27.2	NE	17.4	296
0.013	24.17	1	153	NE	19	1	167	E	28	10.53	9.9	N	11.7	281
0.013	24.18	1	167	E	28	1	164	E	23	5.16	178.6	N	6.1	90
0.013	25.58	1	163	E	36	1	172	E	34	5.53	102.8	E	32.2	8
0.013	25.78	1	147	NE	20	1	140	NE	28	8.48	125.4	SE	7.6	214
0.013	26.16	1	158	E	34	1	172	E	26	10.58	127.6	SE	18.8	33
0.013	35.6	2	125.7	NE	25.5	1	140	NE	24	6.15	57.8	NE	23.8	326
0.013	47.54	1	171	E	45	1	153	NE	43	12.63	59.6	NE	42.9	155
0.013	47.59	1	156	NE	46	1	153	NE	51	5.48	137.9	SE	17.8	221
0.013	47.62	1	118	NE	50	1	132	NE	38	15.39	94.5	E	25.5	354
0.013	47.7	1	156	NE	38	1	155	NE	33	5.03	160.9	N	3.8	72
0.013	47.71	1	155	NE	33	1	154	NE	37	4.04	147.8	SE	4.7	236
0.013	47.73	1	154	NE	37	1	150	NE	37	2.41	62	NE	37	152
0.013	47.74	1	150	NE	37	1	145	NE	33	4.92	178	N	19.5	94
0.016	24.18	1	153	NE	19	2	165.6	E	25.5	8.03	13.8	N	12.7	285
0.016	25.59	1	163	E	36	1	172	E	34	5.53	102.8	E	32.2	8
0.016	25.6	1	172	E	34	1	167	E	29	5.64	13.6	N	13.9	107
0.016	25.79	2	142.9	NE	24	1	169	E	29	12.54	40.5	NE	23.5	312
0.016	25.81	1	169	E	29	1	159	E	14	15.39	177	N	4.4	88
0.016	26.16	1	158	E	34	1	172	E	26	10.58	127.6	SE	18.8	33
0.016	35.61	2	125.7	NE	25.5	1	140	NE	24	6.15	57.8	NE	23.8	326
0.016	47.52	1	177	E	14	1	171	E	45	31.1	169	S	2	259
0.016	47.54	1	171	E	45	1	153	NE	43	12.63	59.6	NE	42.9	155
0.016	47.59	1	156	NE	46	1	153	NE	51	5.48	137.9	SE	17.8	221
0.016	47.68	1	154	NE	30	1	156	NE	38	8.08	161.6	N	4.4	253
0.016	47.7	1	156	NE	38	1	155	NE	33	5.03	160.9	N	3.8	72
0.016	47.71	1	155	NE	33	1	154	NE	37	4.04	147.8	SE	4.7	236
0.016	47.73	1	154	NE	37	2	147.6	NE	35	4.26	27.1	NE	31.1	123
0.016	47.9	2	112	N	17.5	1	100	N	20	4.57	50.3	NE	15.5	139
0.02	24.18	1	153	NE	19	2	165.6	E	25.5	8.03	13.8	N	12.7	285
0.02	24.59	1	153	NE	21	1	165	E	29	9.44	9.1	N	12.7	281
0.02	25.59	2	167.4	E	34.9	1	167	E	29	5.92	168.9	N	1	79
0.02	25.79	2	142.9	NE	24	1	169	E	29	12.54	40.5	NE	23.5	312
0.02	25.81	1	169	E	29	1	159	E	14	15.39	177	N	4.4	88
0.02	26.15	1	158	E	34	1	172	E	26	10.58	127.6	SE	18.8	33
0.02	35.61	2	125.7	NE	25.5	1	140	NE	24	6.15	57.8	NE	23.8	326
0.02	47.52	1	177	E	14	1	171	E	45	31.1	169	S	2	259
0.02	47.54	1	171	E	45	1	153	NE	43	12.63	59.6	NE	42.9	155
0.02	47.68	1	154	NE	30	1	156	NE	38	8.08	161.6	N	4.4	253
0.02	47.7	1	156	NE	38	1	155	NE	33	5.03	160.9	N	3.8	72
0.02	47.72	1	155	NE	33	2	152	NE	37	4.34	134	SE	13.1	220
0.02	47.74	2	152	NE	37	1	145	NE	33	5.65	8.1	N	23.9	104
0.02	47.76	1	145	NE	33	1	140	NE	32	2.87	28.7	NE	30.2	122
0.02	47.9	1	93	N	19	1	132	NE	18	12.2	27.2	NE	17.4	296
0.02	47.92	1	132	NE	18	1	100	N	20	10.48	37.2	NE	17.9	127
0.025	23	1	167	E	26	1	154	NE	10	16.4	174.2	N	3.5	85
0.025	24.18	2	161.3	E	23.3	1	164	E	23	1.13	92.1	E	22	358
0.025	24.21	1	164	E	23	1	158	E	8	15.07	167	N	1.3	77
0.025	25.56	1	160	E	25	1	163	E	36	11.1	168.3	N	3.9	259
0.025	25.59	1	163	E	36	2	169.7	E	31.5	5.84	132	SE	20.5	36
0.025	25.79	1	147	NE	20	2	154.7	NE	27.7	8.32	171.3	N	8.5	263

0.032	47.77	1	145	NE	33	1	140	NE	32	2.87	28.7	NE	30.2	122
0.032	47.8	1	140	NE	32	1	143	NE	32	1.59	51.5	NE	32	321
0.032	47.89	1	93	N	19	2	115.2	NE	18.3	7.08	19.8	N	18.2	289
0.04	6.79	1	166	E	31	1	152	NE	24	9.49	18.5	N	17.9	113
0.04	13.72	1	163	E	38	1	168	E	38	3.08	75.5	E	38	345
0.04	22.99	1	167	E	26	1	154	NE	10	16.4	174.2	N	3.5	85
0.04	24.19	2	161.3	E	23.3	1	164	E	23	1.13	92.1	E	22	358
0.04	24.23	1	164	E	23	2	158.7	E	13.5	9.63	170.8	N	2.9	81
0.04	24.38	1	125	NE	12	1	135	NE	26	14.32	142.6	NW	3.7	233
0.04	24.54	1	154	NE	23	1	153	NE	21	2.03	163.4	N	3.9	74
0.04	24.58	1	153	NE	21	1	165	E	29	9.44	9.1	N	12.7	281
0.04	25.58	1	160	E	25	3	167.3	E	32.9	8.68	4.9	N	11.1	277
0.04	25.82	3	152.6	NE	25.1	1	159	E	14	11.28	145.5	SE	3.3	55
0.04	26.14	1	175	E	24	2	164.1	E	29.8	7.59	132.5	SE	16.7	220
0.04	34.93	1	155	NE	20	1	170	E	30	11.77	12.6	N	12.5	284
0.04	36.37	1	124	NE	22	1	148	NE	33	15.42	178.4	N	18.2	270
0.04	47.51	1	177	E	14	2	162.2	E	43.6	30.28	157	SE	4.9	247
0.04	47.55	2	162.2	E	43.6	2	154.4	NE	48.5	7.37	119.7	SE	32.8	201
0.04	47.59	2	154.4	NE	48.5	2	124.2	NE	43.8	22.14	32.4	NE	43.8	132
0.04	47.63	2	124.2	NE	43.8	1	154	NE	30	22.25	92.2	E	27	353
0.04	47.67	1	154	NE	30	2	155.5	NE	35.5	5.56	162	N	4.6	253
0.04	47.71	2	155.5	NE	35.5	3	149.8	NE	35.6	3.32	65.1	NE	35.5	155
0.04	47.75	3	149.8	NE	35.6	1	140	NE	32	6.54	16.5	N	27.5	112
0.04	47.79	1	140	NE	32	1	143	NE	32	1.59	51.5	NE	32	321
0.04	47.91	2	112	N	17.5	1	100	N	20	4.57	50.3	NE	15.5	139
0.04	47.95	1	100	N	20	1	139	NE	20	13.11	29.5	NE	18.9	298
0.05	6.56	1	177	E	26	1	164	E	35	11.11	138	SE	17.1	225
0.05	6.71	1	158	E	30	1	166	E	31	4.18	56.1	NE	29.5	328
0.05	13.73	1	163	E	38	1	168	E	38	3.08	75.5	E	38	345
0.05	23	1	167	E	26	1	154	NE	10	16.4	174.2	N	3.5	85
0.05	24.2	3	162.2	E	23.2	1	158	E	8	15.26	164.2	N	0.9	74
0.05	24.25	1	158	E	8	1	159	E	19	11	159.7	N	0.2	250
0.05	24.3	1	159	E	19	1	125	NE	12	11.19	14.3	N	11.2	106
0.05	24.55	1	154	NE	23	1	153	NE	21	2.03	163.4	N	3.9	74
0.05	24.6	1	153	NE	21	1	165	E	29	9.44	9.1	N	12.7	281
0.05	25.5	1	155	NE	22	1	160	E	25	3.6	8.9	N	12.7	281
0.05	25.55	1	160	E	25	2	167.4	E	34.9	10.56	1.7	N	9.8	274
0.05	25.6	2	167.4	E	34.9	1	167	E	29	5.92	168.9	N	1	79
0.05	25.8	2	142.9	NE	24	2	165.7	E	21.4	9.07	81.4	E	21.3	350
0.05	26.15	2	165.1	E	28.7	1	172	E	26	4.17	122.9	SE	20.2	29
0.05	34.93	1	155	NE	20	1	170	E	30	11.77	12.6	N	12.5	284
0.05	35.63	3	130.3	NE	24.8	1	150	NE	29	9.8	22.7	NE	23.8	294
0.05	36.38	1	124	NE	22	1	148	NE	33	15.42	178.4	N	18.2	270
0.05	40.74	1	145	NE	12	1	120	NE	19	9.53	89.4	E	10	179
0.05	47.56	3	164.3	E	34	2	154.4	NE	48.5	15.83	140.5	SE	15.2	226
0.05	47.61	2	154.4	NE	48.5	2	124.2	NE	43.8	22.14	32.4	NE	43.8	132
0.05	47.66	2	124.2	NE	43.8	2	155.1	NE	34	21.47	81.9	E	32.8	343
0.05	47.71	2	155.1	NE	34	4	151.1	NE	34.9	2.48	89.6	E	31.5	175
0.05	47.76	4	151.1	NE	34.9	1	140	NE	32	6.76	25.6	NE	29.6	121
0.05	47.81	1	140	NE	32	1	143	NE	32	1.59	51.5	NE	32	321
0.05	47.86	1	143	NE	32	2	112	N	17.5	19.03	167.6	N	14.6	81
0.05	47.91	2	112	N	17.5	1	100	N	20	4.57	50.3	NE	15.5	139
0.05	47.96	1	100	N	20	1	139	NE	20	13.11	29.5	NE	18.9	298
0.063	6.56	1	177	E	26	1	164	E	35	11.11	138	SE	17.1	225
0.063	6.62	1	164	E	35	1	158	E	30	5.94	9.6	N	16.8	104
0.063	6.81	1	166	E	31	1	152	NE	24	9.49	18.5	N	17.9	113
0.063	22.71	1	172	E	16	1	5	S	40	24.63	11.6	N	5.5	282
0.063	24.22	3	162.2	E	23.2	2	158.7	E	13.5	9.78	166.6	N	1.9	77
0.063	24.54	1	154	NE	23	1	153	NE	21	2.03	163.4	N	3.9	74
0.063	24.6	1	153	NE	21	1	165	E	29	9.44	9.1	N	12.7	281
0.063	25.8	2	142.9	NE	24	2	165.7	E	21.4	9.07	81.4	E	21.3	350
0.063	26.12	1	175	E	24	2	164.1	E	29.8	7.59	132.5	SE	16.7	220
0.063	34.95	1	155	NE	20	1	170	E	30	11.77	12.6	N	12.5	284
0.063	35.01	1	170	E	30	1	160	E	25	6.79	24.4	NE	18.1	118
0.063	35.64	3	130.3	NE	24.8	1	150	NE	29	9.8	22.7	NE	23.8	294
0.063	39.74	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.063	41.07	1	176	E	11	1	20	S	25	15.57	35.3	NE	7	306
0.063	43.91	1	160	E	18	1	157	NE	29	11.06	152.8	SE	2.3	242
0.063	47.57	3	164.3	E	34	4	140.2	NE	45.1	18.75	104.9	E	30.1	190
0.063	47.63	4	140.2	NE	45.1	2	155.1	NE	34	14.54	114.1	SE	23.9	15
0.063	47.69	2	155.1	NE	34	4	151.1	NE	34.9	2.48	89.6	E	31.5	175
0.063	47.76	4	151.1	NE	34.9	1	140	NE	32	6.76	25.6	NE	29.6	121
0.063	47.82	1	140	NE	32	1	143	NE	32	1.59	51.5	NE	32	321
0.063	47.88	1	143	NE	32	3	107.6	N	18.3	19.84	171.2	N	16.5	85
0.063	47.95	3	107.6	N	18.3	1	139	NE	20	10.32	23.4	NE	18.2	293
0.063	49.65	1	150	NE	27	1	143	NE	34	7.84	122.8	SE	13.1	210
0.079	4.58	1	170	E	32	1	1	S	31	5.83	97	E	30.9	5
0.079	6.56	1	177	E	26	1	164	E	35	11.11	138	SE	17.1	225
0.079	6.64	1	164	E	35	1	158	E	30	5.94	9.6	N	16.8	104

0.079	47.87	1	143	NE	32	3	107.6	N	18.3	19.84	171.2	N	16.5	85
0.079	47.95	3	107.6	N	18.3	1	139	NE	20	10.32	23.4	NE	18.2	293
0.079	49.61	1	150	NE	27	1	143	NE	34	7.84	122.8	SE	13.1	210
0.1	0.06	1	152	NE	22	1	163	E	29	8.42	9.1	N	13.7	281
0.1	4.56	1	170	E	32	1	1	S	31	5.83	97	E	30.9	5
0.1	5.46	1	170	E	30	1	170	E	42	12	170	N	0	260
0.1	6.56	1	177	E	26	1	164	E	35	11.11	138	SE	17.1	225
0.1	6.66	1	164	E	35	2	162.1	E	30.4	4.68	174	N	6.9	86
0.1	6.76	2	162.1	E	30.4	1	152	NE	24	7.89	9.6	N	15.2	103
0.1	7.26	1	163	E	32	1	165	E	20	12.03	160.2	S	1.7	70
0.1	22.96	1	133	NE	11	2	163.3	E	17.9	10.03	15.6	N	9.8	286
0.1	24.26	4	161.7	E	19.5	2	145.9	NE	14.9	6.51	18.4	N	11.9	110
0.1	24.36	2	145.9	NE	14.9	1	135	NE	26	11.7	122.5	SE	6	212
0.1	24.46	1	135	NE	26	1	154	NE	23	8.39	77	E	22.5	344
0.1	24.56	1	154	NE	23	2	159.9	E	24.9	3.04	26.3	NE	18.6	298
0.1	25.56	2	157.7	E	23.5	3	167.3	E	32.9	10.47	5.6	N	11.5	278
0.1	26.16	2	165.1	E	28.7	1	172	E	26	4.17	122.9	SE	20.2	29
0.1	34.86	1	165	E	22	1	155	NE	20	4.1	39.2	NE	18.1	131
0.1	34.96	1	155	NE	20	2	165.4	E	27.4	8.49	7.7	N	11.1	279
0.1	35.66	3	130.3	NE	24.8	1	150	NE	29	9.8	22.7	NE	23.8	294
0.1	35.76	1	150	NE	29	1	140	NE	30	5.02	68.1	E	28.8	157
0.1	36.36	1	124	NE	22	1	148	NE	33	15.42	178.4	N	18.2	270
0.1	36.46	1	148	NE	33	1	143	NE	32	2.87	31.7	NE	30.2	125
0.1	39.75	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.1	40.95	1	137	NE	15	1	176	E	11	9.4	90.7	E	11	360
0.1	41.05	1	176	E	11	1	20	S	25	15.57	35.3	NE	7	306
0.1	47.55	3	164.3	E	34	4	140.2	NE	45.1	18.75	104.9	E	30.1	190
0.1	47.65	4	140.2	NE	45.1	6	152.4	NE	34.6	13.03	116.5	SE	22	18
0.1	47.75	6	152.4	NE	34.6	2	141.5	NE	32	6.51	29.3	NE	30	124
0.1	47.85	2	141.5	NE	32	3	107.6	N	18.3	19.41	169.2	N	16.2	83
0.1	47.95	3	107.6	N	18.3	1	139	NE	20	10.32	23.4	NE	18.2	293
0.1	49.65	1	150	NE	27	1	143	NE	34	7.84	122.8	SE	13.1	210
0.1	70.85	1	141	NE	15	1	162	E	19	7.27	27.6	NE	13.8	298
0.126	0.08	1	152	NE	22	1	163	E	29	8.42	9.1	N	13.7	281
0.126	4.61	1	170	E	32	1	1	S	31	5.83	97	E	30.9	5
0.126	4.74	1	1	S	31	1	160	E	29	10.64	68.2	E	29	161
0.126	4.87	1	160	E	29	1	168	E	26	4.75	116.4	SE	20.9	23
0.126	6.63	2	169.6	E	30.3	2	162.1	E	30.4	3.83	77.5	E	30.3	168
0.126	6.75	2	162.1	E	30.4	1	152	NE	24	7.89	9.6	N	15.2	103
0.126	7.26	1	163	E	32	1	165	E	20	12.03	160.2	S	1.7	70
0.126	9.65	1	167	E	33	1	156	NE	28	7.48	25.5	NE	22	121
0.126	22.74	1	172	E	16	1	5	S	40	24.63	11.6	N	5.5	282
0.126	22.87	1	5	S	40	2	156.9	NE	17.9	25.45	20.3	N	12.5	115
0.126	22.99	2	156.9	NE	17.9	1	154	NE	10	7.89	160.3	N	1.1	71
0.126	24.25	4	161.7	E	19.5	2	145.9	NE	14.9	6.51	18.4	N	11.9	110
0.126	24.38	2	145.9	NE	14.9	1	135	NE	26	11.7	122.5	SE	6	212
0.126	24.5	1	135	NE	26	3	158	E	24.2	9.87	67.7	E	24.2	336
0.126	25.51	1	155	NE	22	4	165.8	E	30.9	10.1	6.3	N	11.8	278
0.126	26.14	1	175	E	24	2	164.1	E	29.8	7.59	132.5	SE	16.7	220
0.126	34.83	1	165	E	22	1	155	NE	20	4.1	39.2	NE	18.1	131
0.126	34.95	1	155	NE	20	2	165.4	E	27.4	8.49	7.7	N	11.1	279
0.126	35.71	4	135.7	NE	25.6	1	140	NE	30	4.83	159.8	N	11	252
0.126	36.46	2	138.3	NE	27	1	143	NE	32	5.51	162.8	N	12	255
0.126	38.23	1	131	NE	28	1	106	N	10	19.37	142.3	NW	6	54
0.126	39.74	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.126	40.74	1	145	NE	12	1	120	NE	19	9.53	89.4	E	10	179
0.126	40.87	1	120	NE	19	1	137	NE	15	6.34	78.4	E	12.9	347
0.126	41	1	137	NE	15	2	12.6	E	17.7	15.27	65.5	NE	14.3	335
0.126	43.89	1	160	E	18	1	157	NE	29	11.06	152.8	SE	2.3	242
0.126	47.54	3	164.3	E	34	4	140.2	NE	45.1	18.75	104.9	E	30.1	190
0.126	47.67	4	140.2	NE	45.1	7	150.7	NE	34.2	12.8	120.1	SE	19.1	23
0.126	47.79	7	150.7	NE	34.2	4	120.1	NE	20.8	19.09	179.5	N	18.1	94
0.126	47.92	4	120.1	NE	20.8	1	139	NE	20	6.61	46.5	NE	20	316
0.126	70.83	1	141	NE	15	1	162	E	19	7.27	27.6	NE	13.8	298
0.158	0.14	1	152	NE	22	1	163	E	29	8.42	9.1	N	13.7	281
0.158	0.29	1	163	E	29	1	156	NE	31	4.03	102.9	E	25.7	190
0.158	4.57	1	170	E	32	1	1	S	31	5.83	97	E	30.9	5
0.158	4.73	1	1	S	31	1	160	E	29	10.64	68.2	E	29	161
0.158	4.89	1	160	E	29	1	168	E	26	4.75	116.4	SE	20.9	23
0.158	5.37	1	170	E	30	1	170	E	42	12	170	N	0	260
0.158	6.63	2	169.6	E	30.3	2	162.1	E	30.4	3.83	77.5	E	30.3	168
0.158	6.79	2	162.1	E	30.4	1	152	NE	24	7.89	9.6	N	15.2	103
0.158	7.27	1	163	E	32	1	165	E	20	12.03	160.2	S	1.7	70
0.158	7.43	1	165	E	20	1	155	NE	24	5.47	118.9	SE	14.7	207
0.158	9.64	1	167	E	33	1	156	NE	28	7.48	25.5	NE	22	121
0.158	18.2	1	156	NE	30	1	158	E	30	1	67	NE	30	337
0.158	22.64	1	172	E	24	2	1.1	E	27.9	5.55	39.4	NE	18.1	312
0.158	22.8	2	1.1	E	27.9	1	133	NE	11	21.98	21	N	10.2	113
0.158	22.96	1	133	NE	11	2	163.3	E	17.9	10.03	15.6	N	9.8	286

0.2	4.58	1	170	E	32	2	170.8	E	29.6	2.45	161.9	S	5	71
0.2	4.78	2	170.8	E	29.6	1	168	E	26	3.82	7.4	N	9.2	100
0.2	5.38	1	170	E	30	1	170	E	42	12	170	N	0	260
0.2	6.58	1	177	E	26	3	162.8	E	32	9.08	124.3	SE	21.2	212
0.2	6.78	3	162.8	E	32	1	152	NE	24	9.39	6.8	N	14.3	100
0.2	9.57	1	167	E	33	1	156	NE	28	7.48	25.5	NE	22	121
0.2	16.15	1	4	S	30	1	155	NE	22	14.81	45.2	NE	20.8	139
0.2	17.95	1	161	E	22	1	156	NE	30	8.29	144.6	SE	6.5	233
0.2	18.15	1	156	NE	30	1	158	E	30	1	67	NE	30	337
0.2	22.54	1	172	E	24	1	172	E	16	8	172	S	0	82
0.2	22.74	1	172	E	16	2	173.8	E	23.9	7.94	177.1	N	1.5	267
0.2	22.94	2	173.8	E	23.9	2	163.3	E	17.9	7.05	18.9	N	10.7	111
0.2	24.33	5	161.2	E	19.4	3	140.2	NE	20	7.07	66	NE	19.3	156
0.2	24.53	3	140.2	NE	20	2	159.9	E	24.9	8.92	25.2	NE	18.3	297
0.2	25.53	1	155	NE	22	4	165.8	E	30.9	10.1	6.3	N	11.8	278
0.2	25.73	4	165.8	E	30.9	4	153.6	NE	22.3	10.16	9.3	N	13.4	103
0.2	25.93	4	153.6	NE	22.3	1	175	E	24	8.52	62	NE	22.3	332
0.2	26.13	1	175	E	24	2	164.1	E	29.8	7.59	132.5	SE	16.7	220
0.2	26.33	2	164.1	E	29.8	1	166	E	27	2.95	149.7	SE	8.1	57
0.2	34.91	2	160.2	E	20.9	2	165.4	E	27.4	6.82	179.5	N	7.2	271
0.2	35.11	2	165.4	E	27.4	1	167	E	25	2.51	151.7	SE	7	60
0.2	35.71	4	135.7	NE	25.6	1	140	NE	30	4.83	159.8	N	11	252
0.2	36.51	2	138.3	NE	27	1	143	NE	32	5.51	162.8	N	12	255
0.2	38.1	1	5	S	35	2	124.3	NE	18.7	30.01	33.9	NE	18.7	129
0.2	39.7	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.2	40.9	2	129.7	NE	15.2	2	153.4	NE	12.3	6.26	78.9	E	11.9	348
0.2	41.1	2	153.4	NE	12.3	1	20	S	25	18.67	46.6	NE	11.8	317
0.2	43.09	1	175	E	43	1	153	NE	17	27.84	5	N	9.2	99
0.2	43.89	1	160	E	18	1	157	NE	29	11.06	152.8	SE	2.3	242
0.2	47.68	8	149.6	NE	38.6	7	149.3	NE	34.4	4.22	151.8	NW	1.7	62
0.2	47.88	7	149.3	NE	34.4	4	115.9	NE	18.2	21.42	173	N	15.4	87
0.2	49.67	1	150	NE	27	1	143	NE	34	7.84	122.8	SE	13.1	210
0.2	70.23	1	155	NE	16	1	143	NE	13	4.23	13.2	N	10.1	104
0.2	70.82	1	141	NE	15	1	162	E	19	7.27	27.6	NE	13.8	298
0.251	0.23	2	158.2	E	25.4	1	156	NE	31	5.7	147.8	SE	4.9	237
0.251	4.5	1	170	E	32	1	1	S	31	5.83	97	E	30.9	5
0.251	4.75	1	1	S	31	2	163.8	E	27.4	9.08	56.7	NE	26.4	150
0.251	6.76	4	165.8	E	30.3	1	152	NE	24	8.91	20.6	N	18.5	115
0.251	7.01	1	152	NE	24	1	163	E	32	9.49	7.3	N	14.4	280
0.251	7.26	1	163	E	32	1	165	E	20	12.03	160.2	S	1.7	70
0.251	7.52	1	165	E	20	1	155	NE	24	5.47	118.9	SE	14.7	207
0.251	17.81	1	161	E	22	1	156	NE	30	8.29	144.6	SE	6.5	233
0.251	22.59	1	172	E	24	2	1.1	E	27.9	5.55	39.4	NE	18.1	312
0.251	22.84	2	1.1	E	27.9	3	156.1	NE	15.2	15.4	23.1	NE	11.2	116
0.251	24.35	5	161.2	E	19.4	4	143.5	NE	20.2	6	70.4	E	19.4	160
0.251	24.6	4	143.5	NE	20.2	1	165	E	29	12.44	17.3	N	16.5	289
0.251	25.6	4	163.4	E	29.1	5	156.9	NE	23.6	6.25	5.1	N	11.6	98
0.251	26.36	3	167.3	E	27.8	1	166	E	27	0.99	21.7	N	16.5	114
0.251	34.9	1	165	E	22	3	162.6	E	24.9	3.02	146.8	SE	7.2	236
0.251	35.15	3	162.6	E	24.9	1	167	E	25	1.86	70.3	E	24.8	342
0.251	35.4	1	167	E	25	3	130.3	NE	24.8	15.25	57.9	NE	23.8	150
0.251	35.65	3	130.3	NE	24.8	2	144.9	NE	29.4	8.07	10.1	N	21.8	282
0.251	36.4	2	138.3	NE	27	1	143	NE	32	5.51	162.8	N	12	255
0.251	38.16	2	160.9	E	28.7	1	106	N	10	24.22	178.9	N	9.6	91
0.251	40.92	3	132.1	NE	15.1	2	12.6	E	17.7	16.49	64.2	NE	14	333
0.251	43.18	1	175	E	43	1	153	NE	17	27.84	5	N	9.2	99
0.251	43.94	1	160	E	18	1	157	NE	29	11.06	152.8	SE	2.3	242
0.251	47.71	9	150.4	NE	38.5	9	139.8	NE	27.8	12.19	169.7	N	14.7	84
0.251	47.96	9	139.8	NE	27.8	1	139	NE	20	7.81	141.5	NW	0.9	52
0.251	50.72	1	145	NE	26	1	147	NE	33	7.07	153	NW	3.9	244
0.251	70.31	1	155	NE	16	1	143	NE	13	4.23	13.2	N	10.1	104
0.251	70.56	1	143	NE	13	1	141	NE	15	2.06	128.8	SE	3.2	218
0.251	70.82	1	141	NE	15	1	162	E	19	7.27	27.6	NE	13.8	298
0.316	0.22	2	158.2	E	25.4	1	156	NE	31	5.7	147.8	SE	4.9	237
0.316	3.38	1	172	E	35	1	179	E	25	10.58	158.5	S	9.3	66
0.316	4.65	2	175.4	E	31.4	1	160	E	29	8.09	58.3	NE	28.5	152
0.316	4.97	1	160	E	29	1	168	E	26	4.75	116.4	SE	20.9	23
0.316	5.28	1	168	E	26	2	170	E	36	10.05	174.1	N	3	265
0.316	6.55	1	177	E	26	4	160.6	E	29.9	8.6	108.5	E	24.4	196
0.316	7.5	2	163.8	E	26	1	155	NE	24	4.21	38.8	NE	21.8	132
0.316	17.93	1	161	E	22	1	156	NE	30	8.29	144.6	SE	6.5	233
0.316	18.25	1	156	NE	30	1	158	E	30	1	67	NE	30	337
0.316	22.67	2	172	E	20	3	171.3	E	24.6	4.63	168.6	S	1.2	258
0.316	22.99	3	171.3	E	24.6	1	154	NE	10	15.35	1.5	N	4.7	93
0.316	24.26	4	161.7	E	19.5	4	144.7	NE	19.6	5.66	64.3	NE	19.3	155
0.316	24.57	4	144.7	NE	19.6	2	159.9	E	24.9	7.79	17.5	N	15.8	289
0.316	25.52	1	155	NE	22	8	160.7	E	26.5	5.08	3.1	N	10.8	275
0.316	25.84	8	160.7	E	26.5	2	165.1	E	28.7	3.04	22.5	NE	18.4	295
0.316	26.15	2	165.1	E	28.7	2	168.9	E	26.5	2.87	132.5	SE	16.5	38

0.398	24.56	8	153.2	NE	19.3	2	159.9	E	24.9	6.11	179.3	N	8.8	271
0.398	25.76	5	164.1	E	29.1	6	158.1	E	24.3	5.44	8.1	N	12.7	101
0.398	26.16	6	158.1	E	24.3	2	168.9	E	26.5	5.09	46.8	NE	22.9	318
0.398	34.91	2	160.2	E	20.9	3	165.9	E	26.6	6.12	3.4	N	8.6	275
0.398	35.31	3	165.9	E	26.6	4	135.7	NE	25.6	13.2	56.1	NE	25.2	148
0.398	35.71	4	135.7	NE	25.6	1	140	NE	30	4.83	159.8	N	11	252
0.398	36.11	1	140	NE	30	2	138.3	NE	27	3.11	152.9	NW	7.3	64
0.398	36.51	2	138.3	NE	27	1	143	NE	32	5.51	162.8	N	12	255
0.398	37.7	1	90	N	19	1	5	S	35	40.69	30.2	NE	16.6	299
0.398	38.1	1	5	S	35	2	124.3	NE	18.7	30.01	33.9	NE	18.7	129
0.398	39.69	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.398	40.89	2	129.7	NE	15.2	3	176.6	E	15.2	11.96	62.9	NE	14	332
0.398	47.65	7	149.1	NE	40	12	142.8	NE	28.1	12.46	159.7	N	8.8	73
0.398	49.64	1	150	NE	27	1	143	NE	34	7.84	122.8	SE	13.1	210
0.398	50.04	1	143	NE	34	1	148	NE	40	6.71	167.4	N	15.6	262
0.398	50.44	1	148	NE	40	1	145	NE	26	14.09	152.1	NW	3.5	63
0.398	50.84	1	145	NE	26	1	147	NE	33	7.07	153	NW	3.9	244
0.398	58.8	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
0.398	70.35	1	155	NE	16	1	143	NE	13	4.23	13.2	N	10.1	104
0.398	70.74	1	143	NE	13	2	152.7	NE	16.7	4.48	0.8	N	8	272
0.501	0.32	2	158.2	E	25.4	1	156	NE	31	5.7	147.8	SE	4.9	237
0.501	3.33	1	172	E	35	1	179	E	25	10.58	158.5	S	9.3	66
0.501	4.83	3	170.5	E	30.4	1	168	E	26	4.55	2.8	N	7.1	94
0.501	5.33	1	168	E	26	2	170	E	36	10.05	174.1	N	3	265
0.501	6.83	5	163.5	E	29	1	163	E	32	3.04	159	S	2.5	248
0.501	7.33	1	163	E	32	2	159.6	E	21.9	10.19	169.2	N	3.8	80
0.501	9.34	1	178	E	43	2	161.9	E	30.4	15.77	21.8	N	20.6	119
0.501	17.86	1	161	E	22	2	157	NE	30	8.18	147.8	SE	5.3	237
0.501	22.37	1	162	E	40	3	178.2	E	26.4	16.12	141	SE	16.7	45
0.501	22.87	3	178.2	E	26.4	3	156.1	NE	15.2	13.54	20.8	N	10.8	113
0.501	24.38	6	157.3	NE	17.8	4	152	NE	24.3	6.8	139.5	SE	5.6	228
0.501	25.88	9	160.1	E	26	3	167.3	E	27.8	3.71	42.2	NE	23.3	314
0.501	26.38	3	167.3	E	27.8	1	166	E	27	0.99	21.7	N	16.5	114
0.501	31.39	1	152	NE	29	1	160	E	24	6.13	123.3	SE	14.9	30
0.501	34.9	2	160.2	E	20.9	3	165.9	E	26.6	6.12	3.4	N	8.6	275
0.501	35.4	3	165.9	E	26.6	5	136.7	NE	26.5	12.94	60.7	NE	25.8	152
0.501	35.9	5	136.7	NE	26.5	2	138.3	NE	27	0.88	7.3	N	21	283
0.501	36.4	2	138.3	NE	27	1	143	NE	32	5.51	162.8	N	12	255
0.501	36.91	1	143	NE	32	1	90	N	19	25.09	176.4	N	19	91
0.501	40.91	3	132.1	NE	15.1	2	12.6	E	17.7	16.49	64.2	NE	14	333
0.501	43.42	2	168.4	E	29.6	1	160	E	18	12.08	179.4	N	6.2	91
0.501	43.92	1	160	E	18	1	157	NE	29	11.06	152.8	SE	2.3	242
0.501	47.93	18	145.9	NE	33	1	139	NE	20	13.33	154.4	NW	5.5	66
0.501	49.94	2	146.1	NE	30.5	1	148	NE	40	9.61	152.3	NW	3.6	243
0.501	50.44	1	148	NE	40	2	146.1	NE	29.5	10.56	151.9	NW	3.3	63
0.501	58.96	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
0.501	70.48	2	149.6	NE	14.4	2	152.7	NE	16.7	2.46	170.3	N	5.2	261
0.631	5.04	4	170	E	29.3	2	170	E	36	6.71	170.1	N	0.1	260
0.631	6.93	5	163.5	E	29	2	163.8	E	26	2.98	161.5	S	1.1	71
0.631	7.57	2	163.8	E	26	1	155	NE	24	4.21	38.8	NE	21.8	132
0.631	9.46	1	178	E	43	2	161.9	E	30.4	15.77	21.8	N	20.6	119
0.631	11.35	1	159	E	25	1	165	E	36	11.4	175.5	N	7.5	267
0.631	18.29	2	158.1	E	26	1	158	E	30	4.02	157.2	SE	0.4	247
0.631	21.45	1	128	NE	12	1	162	E	40	30.67	172.2	N	8.4	263
0.631	22.08	1	162	E	40	2	172	E	20	20.55	154.5	SE	6.2	62
0.631	22.71	2	172	E	20	4	168.9	E	20.6	1.24	111.4	E	17.6	200
0.631	24.6	9	153.2	NE	19.5	1	165	E	29	10.63	4.2	N	10.4	276
0.631	25.23	1	165	E	29	9	160.1	E	26	3.76	16.2	N	16	110
0.631	25.86	9	160.1	E	26	4	167	E	27.6	3.48	43.8	NE	23.6	316
0.631	31.54	1	152	NE	29	1	160	E	24	6.13	123.3	SE	14.9	30
0.631	35.33	5	163.9	E	24.3	5	136.7	NE	26.5	11.78	71.7	E	24.3	162
0.631	35.96	5	136.7	NE	26.5	3	140.1	NE	28.7	2.7	170.3	N	15.4	264
0.631	37.85	1	90	N	19	3	152.5	NE	21.1	20.57	25.8	NE	17.2	295
0.631	39.74	1	106	N	16	1	107	N	13	3.01	101.9	E	1.2	12
0.631	40.38	1	107	N	13	3	132.1	NE	15.1	6.39	10.5	N	12.9	280
0.631	41.01	3	132.1	NE	15.1	2	12.6	E	17.7	16.49	64.2	NE	14	333
0.631	43.53	2	168.4	E	29.6	2	158.2	E	23.5	7.63	17.3	N	15.3	111
0.631	47.95	18	145.9	NE	33	1	139	NE	20	13.33	154.4	NW	5.5	66
0.631	49.84	2	146.1	NE	30.5	1	148	NE	40	9.61	152.3	NW	3.6	243
0.631	50.47	1	148	NE	40	2	146.1	NE	29.5	10.56	151.9	NW	3.3	63
0.631	70.66	2	149.6	NE	14.4	2	152.7	NE	16.7	2.46	170.3	N	5.2	261
0.631	71.29	2	152.7	NE	16.7	1	175	E	28	13.92	19.2	N	12.3	290
0.794	0.76	3	157.4	NE	27.3	1	159	E	19	8.29	154.1	SE	1.7	64
0.794	3.94	2	175	E	30	2	175.4	E	31.4	1.45	3.1	N	4.7	273
0.794	4.73	2	175.4	E	31.4	4	167.3	E	31.6	4.27	85.4	E	31.4	175
0.794	7.12	5	163.5	E	29	3	161	E	25.3	3.88	177.7	N	7.8	90
0.794	9.5	1	178	E	43	2	161.9	E	30.4	15.77	21.8	N	20.6	119
0.794	11.88	1	159	E	25	1	165	E	36	11.4	175.5	N	7.5	267
0.794	18.24	2	158.1	E	26	1	158	E	30	4.02	157.2	SE	0.4	247

1	11.91	1	159	E	25	1	165	E	36	11.4	175.5	N	7.5	267
1	12.91	1	165	E	36	2	165.5	E	38	2	172.2	N	5.2	264
1	16.91	2	171.6	E	25.3	1	161	E	22	5.37	36.3	NE	18.4	129
1	17.91	1	161	E	22	2	157	NE	30	8.18	147.8	SE	5.3	237
1	21.91	1	128	NE	12	5	169.6	E	25.5	18.2	13.6	N	11	284
1	22.91	5	169.6	E	25.5	2	163.3	E	17.9	7.89	2.6	N	6.1	94
1	23.91	2	163.3	E	17.9	10	154.8	NE	20.4	3.74	112.5	E	14.1	201
1	24.91	10	154.8	NE	20.4	9	160.1	E	26	5.95	176.4	N	7.8	268
1	25.91	9	160.1	E	26	4	167	E	27.6	3.48	43.8	NE	23.6	316
1	26.91	4	167	E	27.6	1	154	NE	30	6.7	94.2	E	26.5	182
1	34.91	2	160.2	E	20.9	8	147.6	NE	25.8	6.98	110.6	E	16.2	199
1	35.91	8	147.6	NE	25.8	3	140.1	NE	28.7	4.49	96.6	E	20.6	184
1	36.9	3	140.1	NE	28.7	1	90	N	19	21.59	179	N	19	93
1	37.9	1	90	N	19	3	152.5	NE	21.1	20.57	25.8	NE	17.2	295
1	38.9	3	152.5	NE	21.1	2	106.4	N	14.5	15.03	14.4	N	14.5	107
1	39.9	2	106.4	N	14.5	3	132.1	NE	15.1	6.53	24.1	NE	14.4	294
1	40.9	3	132.1	NE	15.1	2	12.6	E	17.7	16.49	64.2	NE	14	333
1	43.9	3	166.2	E	25.4	1	157	NE	29	5.53	115.4	SE	20.2	203
1	44.9	1	157	NE	29	1	11	S	32	17.31	72.9	E	28.9	342
1	47.9	17	147.3	NE	34.1	2	119.5	NE	18.9	19.22	170.6	N	14.9	85
1	48.9	2	119.5	NE	18.9	2	146.1	NE	30.5	15.76	174.8	N	15.8	266
1	49.9	2	146.1	NE	30.5	3	146.9	NE	33	2.57	153.7	NW	4.4	246
1	58.9	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
1	70.9	3	146.7	NE	14.6	2	169.7	E	23.4	11.39	17.5	N	11.4	288
1.259	1.03	3	157.4	NE	27.3	1	159	E	19	8.29	154.1	SE	1.7	64
1.259	2.28	1	159	E	19	1	172	E	35	16.97	4	N	8.3	275
1.259	3.54	1	172	E	35	4	172.4	E	29	6.01	170.5	S	1	80
1.259	4.8	4	172.4	E	29	3	169.5	E	32.6	3.93	151.4	SE	11.2	239
1.259	6.06	3	169.5	E	32.6	6	163.4	E	29.5	4.42	26.8	NE	21.2	122
1.259	7.32	6	163.4	E	29.5	2	159.6	E	21.9	7.74	172.8	N	5.3	84
1.259	8.58	2	159.6	E	21.9	3	168.4	E	34.3	13.04	0.6	N	8.2	272
1.259	14.87	2	165.5	E	38	1	4	S	30	12.98	127.3	SE	25.8	31
1.259	16.13	1	4	S	30	1	155	NE	22	14.81	45.2	NE	20.8	139
1.259	17.39	1	155	NE	22	3	158.1	E	27.3	5.48	169	N	5.6	260
1.259	22.43	2	153.9	NE	25.3	6	169.9	E	20.4	7.87	112.1	E	17.5	19
1.259	23.69	6	169.9	E	20.4	10	154.8	NE	20.4	5.25	72.6	E	20.2	163
1.259	24.95	10	154.8	NE	20.4	12	162	E	26.4	6.64	2.1	N	9.7	274
1.259	26.2	12	162	E	26.4	2	159.7	E	28.4	2.23	135.1	SE	12.7	223
1.259	31.24	1	152	NE	29	1	160	E	24	6.13	123.3	SE	14.9	30
1.259	35.02	3	164.2	E	23.9	7	144	NE	25.6	8.6	76.3	E	23.9	166
1.259	36.28	7	144	NE	25.6	4	131.5	NE	25	5.34	41.4	NE	25	132
1.259	37.53	4	131.5	NE	25	3	152.5	NE	21.1	9.02	79	E	20.3	346
1.259	38.79	3	152.5	NE	21.1	2	106.4	N	14.5	15.03	14.4	N	14.5	107
1.259	40.05	2	106.4	N	14.5	5	157.7	E	14	12.23	44.2	NE	12.9	313
1.259	43.83	2	168.4	E	29.6	2	158.2	E	23.5	7.63	17.3	N	15.3	111
1.259	45.09	2	158.2	E	23.5	1	11	S	32	17.2	53.2	NE	22.8	324
1.259	46.35	1	11	S	32	5	159.4	E	40.1	20.05	113	SE	31.4	201
1.259	47.61	5	159.4	E	40.1	14	139.3	NE	30	15.25	12.9	N	25	110
1.259	48.86	14	139.3	NE	30	2	146.1	NE	30.5	3.45	44.8	NE	30	314
1.259	50.12	2	146.1	NE	30.5	3	146.9	NE	33	2.57	153.7	NW	4.4	246
1.259	58.94	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
1.259	70.27	1	155	NE	16	3	150	NE	15.4	1.47	39.5	NE	14.5	129
1.259	71.53	3	150	NE	15.4	1	175	E	28	15.35	17.6	N	11.5	288
1.259	72.78	1	175	E	28	1	60	NW	2	28.9	178.3	N	1.8	89
1.585	1.24	3	157.4	NE	27.3	1	159	E	19	8.29	154.1	SE	1.7	64
1.585	2.83	1	159	E	19	2	175	E	30	12.71	16.1	N	11.7	288
1.585	4.41	2	175	E	30	6	170	E	31.5	2.98	117.6	SE	25.9	203
1.585	6	6	170	E	31.5	8	162.6	E	27.6	5.33	25.2	NE	19.4	120
1.585	7.58	8	162.6	E	27.6	1	178	E	43	17.69	15.9	N	16	289
1.585	9.17	1	178	E	43	2	161.9	E	30.4	15.77	21.8	N	20.6	119
1.585	10.75	2	161.9	E	30.4	2	162.5	E	30.5	0.31	54.4	NE	29.2	324
1.585	12.34	2	162.5	E	30.5	2	165.5	E	38	7.69	174.6	N	7	266
1.585	17.09	2	171.6	E	25.3	3	158.1	E	27.3	6.32	95.5	E	24.6	184
1.585	21.85	1	128	NE	12	7	168.2	E	23.2	15.91	15.4	N	11.1	286
1.585	23.43	7	168.2	E	23.2	10	154.8	NE	20.4	5.66	40.5	NE	18.7	133
1.585	25.02	10	154.8	NE	20.4	13	162.3	E	26.5	6.73	3	N	10	274
1.585	26.6	13	162.3	E	26.5	1	154	NE	30	5.3	113.7	SE	20.5	200
1.585	31.36	1	152	NE	29	1	160	E	24	6.13	123.3	SE	14.9	30
1.585	36.11	10	149.8	NE	24.8	4	131.5	NE	25	7.67	52.7	NE	24.6	143
1.585	37.7	4	131.5	NE	25	3	152.5	NE	21.1	9.02	79	E	20.3	346
1.585	39.28	3	152.5	NE	21.1	4	118.3	NE	14.5	12.1	12.8	N	14	105
1.585	40.87	4	118.3	NE	14.5	3	176.6	E	15.2	14.37	55	NE	13	324
1.585	42.45	3	176.6	E	15.2	4	163.6	E	26.3	11.93	148.7	SE	7.2	238
1.585	47.21	1	11	S	32	19	145.6	NE	32.3	23.69	79	E	30.1	172
1.585	48.79	19	145.6	NE	32.3	3	146.9	NE	33.6	1.54	168.8	N	14	265
1.585	50.38	3	146.9	NE	33.6	2	146.1	NE	29.5	4.16	151.1	NW	2.8	62
1.585	70.98	4	151.3	NE	15.6	1	175	E	28	15	17.1	N	11.3	288
1.585	72.57	1	175	E	28	1	60	NW	2	28.9	178.3	N	1.8	89
1.995	1.99	4	157.7	E	25.2	2	175	E	30	9.26	42.7	NE	23.1	315

2.512	21.83	1	128	NE	12	12	165.4	E	21.5	13.92	15.3	N	11.1	286
2.512	24.35	12	165.4	E	21.5	18	159.2	E	25	4.31	129.5	SE	13	218
2.512	26.86	18	159.2	E	25	1	154	NE	30	5.51	133.5	SE	11.4	221
2.512	29.37	1	154	NE	30	2	155.6	NE	26.4	3.64	143.9	SE	5.8	53
2.512	36.9	13	147.3	NE	25.6	4	137.9	NE	18.5	7.92	167.4	N	9.4	79
2.512	39.42	4	137.9	NE	18.5	7	142.8	NE	13	5.6	127	SE	3.6	37
2.512	41.93	7	142.8	NE	13	4	163.6	E	26.3	14.79	0.2	N	8	271
2.512	44.44	4	163.6	E	26.3	1	11	S	32	14.36	61.7	NE	25.8	333
2.512	46.95	1	11	S	32	19	145.6	NE	32.3	23.69	79	E	30.1	172
2.512	49.46	19	145.6	NE	32.3	5	146.6	NE	32	0.6	89	E	27.8	355
2.512	72.07	5	158.4	E	17.7	1	60	NW	2	18.11	164.4	N	1.9	75
3.162	2.12	4	157.7	E	25.2	6	171.7	E	29.5	7.69	37.8	NE	22.2	310
3.162	5.28	6	171.7	E	29.5	10	164.4	E	29.2	3.56	72.8	E	29.2	164
3.162	8.44	10	164.4	E	29.2	4	166.4	E	31.9	2.87	3.8	N	10.5	276
3.162	11.61	4	166.4	E	31.9	3	165.3	E	37.3	5.46	160.5	S	3.7	249
3.162	14.77	3	165.3	E	37.3	3	168.3	E	24.1	13.3	161.1	S	3.2	70
3.162	17.93	3	168.3	E	24.1	2	157	NE	30	7.81	124.7	SE	17.1	212
3.162	21.09	2	157	NE	30	12	164.2	E	20.7	9.78	143.8	SE	7.5	52
3.162	24.26	12	164.2	E	20.7	20	158.8	E	25	4.74	137.3	SE	9.7	226
3.162	33.74	2	155.6	NE	26.4	13	147.3	NE	25.6	3.76	47.2	NE	25.3	139
3.162	36.91	13	147.3	NE	25.6	6	128	NE	16.5	11.29	173.5	N	12	86
3.162	40.07	6	128	NE	16.5	7	162.2	E	18.1	10.14	46.5	NE	16.4	316
3.162	43.23	7	162.2	E	18.1	3	171.1	E	25.4	8.05	9.4	N	8.5	281
3.162	46.39	3	171.1	E	25.4	19	145.6	NE	32.3	13.95	100.2	E	24.2	189
3.162	49.55	19	145.6	NE	32.3	5	146.6	NE	32	0.6	89	E	27.8	355
3.162	59.04	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
3.162	68.53	1	152	NE	22	4	151.3	NE	15.6	6.43	153.6	NW	0.7	64
3.162	71.69	4	151.3	NE	15.6	2	171	E	13.6	5.32	93.1	E	13.3	3
3.981	3.07	4	157.7	E	25.2	13	168.4	E	30.2	7.05	24.3	NE	18.9	297
3.981	7.05	13	168.4	E	30.2	6	165.1	E	29.7	1.71	56.2	NE	28.3	150
3.981	11.03	6	165.1	E	29.7	4	164.2	E	34.2	4.58	159.3	S	3.3	249
3.981	15.01	4	164.2	E	34.2	5	163.2	E	26.4	7.9	166.7	N	1.8	77
3.981	18.99	5	163.2	E	26.4	6	166	E	22.6	3.91	148.6	SE	7.1	57
3.981	22.97	6	166	E	22.6	25	159.8	E	23.3	2.54	90.1	E	22	179
3.981	26.95	25	159.8	E	23.3	1	154	NE	30	7.15	137.7	SE	9.2	226
3.981	30.93	1	154	NE	30	4	157.7	E	23.7	6.55	142.6	SE	6.5	51
3.981	34.91	4	157.7	E	23.7	15	144.1	NE	24.5	5.62	70.7	E	23.6	160
3.981	38.9	15	144.1	NE	24.5	7	142.8	NE	13	11.5	145.4	NW	0.6	56
3.981	42.88	7	142.8	NE	13	5	170	E	27	16.44	9.2	N	9.5	280
3.981	46.86	5	170	E	27	23	145.8	NE	32.2	12.91	93.8	E	26.3	183
3.981	50.84	23	145.8	NE	32.2	1	147	NE	33	1.08	0.2	N	19.6	275
3.981	54.82	1	147	NE	33	1	145	NE	23	10.04	150.8	NW	2.4	61
3.981	58.8	1	145	NE	23	1	158	E	22	5.06	73.7	E	21.9	342
3.981	62.78	1	158	E	22	1	152	NE	22	2.25	65	NE	22	155
3.981	66.76	1	152	NE	22	2	149.6	NE	14.4	7.61	156.2	NW	1.7	66
3.981	70.74	2	149.6	NE	14.4	4	160.7	E	15.1	2.89	52	NE	14.3	321
5.012	4.33	6	164	E	26.5	15	167.1	E	30.1	3.81	5.2	N	10.2	278
5.012	9.34	15	167.1	E	30.1	6	163.5	E	32.9	3.44	136	SE	16.6	222
5.012	14.35	6	163.5	E	32.9	5	163.2	E	26.4	6.59	164.3	N	0.6	75
5.012	19.36	5	163.2	E	26.4	14	162.2	E	19.7	6.63	165.9	N	1.3	76
5.012	24.38	14	162.2	E	19.7	18	159.7	E	26.1	6.45	152.9	SE	3.3	242
5.012	29.39	18	159.7	E	26.1	2	155.6	NE	26.4	1.81	79.5	E	25.8	167
5.012	34.4	2	155.6	NE	26.4	17	145.8	NE	24	4.84	28.3	NE	21.6	121
5.012	39.41	17	145.8	NE	24	11	153.7	NE	17.4	7.15	128.1	SE	7.7	37
5.012	44.42	11	153.7	NE	17.4	20	147.7	NE	31.9	14.65	141.6	SE	3.8	231
5.012	49.43	20	147.7	NE	31.9	5	146.6	NE	32	0.58	67.9	E	31.5	157
5.012	54.45	5	146.6	NE	32	2	151.4	NE	22.4	9.84	137.5	SE	5.6	46
5.012	69.48	1	152	NE	22	6	157	NE	14.8	7.39	142.7	SE	3.7	52
6.31	5.36	10	166.6	E	27.6	14	165	E	30	2.46	150.2	SE	8.4	238
6.31	11.67	14	165	E	30	6	166.6	E	30.7	1.11	26.7	NE	21	305
6.31	17.98	6	166.6	E	30.7	15	162.6	E	21.8	9.07	174.7	N	4.8	86
6.31	24.29	15	162.6	E	21.8	19	158.8	E	25.3	3.75	139	SE	9.1	227
6.31	30.6	19	158.8	E	25.3	15	148.4	NE	25.7	4.49	69.3	E	25.3	159
6.31	36.91	15	148.4	NE	25.7	13	147.4	NE	16.7	9.03	150.1	NW	0.8	60
6.31	43.21	13	147.4	NE	16.7	22	148.4	NE	31	14.37	149.4	NW	0.6	239
6.31	49.52	22	148.4	NE	31	5	146.6	NE	32	1.35	105.9	E	22.1	194
6.31	55.83	5	146.6	NE	32	2	151.4	NE	22.4	9.84	137.5	SE	5.6	46
6.31	62.14	2	151.4	NE	22.4	1	152	NE	22	0.44	120.6	SE	11.9	32
6.31	68.45	1	152	NE	22	6	157	NE	14.8	7.39	142.7	SE	3.7	52
7.943	5.13	10	166.6	E	27.6	15	165	E	30.4	2.86	152.4	SE	7.3	240
7.943	13.08	15	165	E	30.4	7	164	E	29.7	0.85	16.1	N	16.8	110
7.943	21.02	7	164	E	29.7	32	160.6	E	23.4	6.47	174.5	N	5.9	86
7.943	28.96	32	160.6	E	23.4	15	148.4	NE	25.7	5.55	91.1	E	22.1	179
7.943	36.91	15	148.4	NE	25.7	15	149.5	NE	17.6	8.11	146.4	SE	1	56
7.943	44.85	15	149.5	NE	17.6	25	147.4	NE	31.9	14.33	145.3	SE	1.3	235
7.943	52.79	25	147.4	NE	31.9	2	151.4	NE	22.4	9.69	139.8	SE	4.7	48
7.943	60.73	2	151.4	NE	22.4	1	152	NE	22	0.44	120.6	SE	11.9	32
7.943	68.68	1	152	NE	22	6	157	NE	14.8	7.39	142.7	SE	3.7	52
10	6.91	17	166.2	E	29	12	165.7	E	30.5	1.51	157.9	S	4.5	247

Section II

window size (m)	elevation between two consecutive windows (m)	lower window number of measures	average orientation			upper window number of measures	average orientation			tilt angle (°)	tilt axis			tilt way (°)
0.02	45.43	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.025	44.78	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.025	45.44	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.032	11.76	1	8	S	24	1	170	E	35	14.02	143.6	SE	17.3	231
0.032	44.96	1	155	NE	28	1	156	NE	34	6.02	159.7	N	2.5	250
0.032	45.43	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.04	11.77	1	8	S	24	1	170	E	35	14.02	143.6	SE	17.3	231
0.04	44.49	1	170	E	32	1	167	E	36	4.34	149.3	SE	12.5	236
0.04	44.61	1	160	E	37	1	145	NE	34	9.19	39.7	NE	33	135
0.04	44.73	1	152	NE	33	1	145	NE	37	5.66	109	E	23.9	194
0.04	44.77	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.04	44.89	1	148	NE	32	1	155	NE	28	5.31	114.3	SE	19.1	20
0.04	45.09	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.04	45.21	1	158	E	33	1	159	E	29	4.03	152.2	SE	3.8	61
0.04	45.33	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.04	45.45	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.04	45.49	1	141	NE	33	1	152	NE	53	21.3	162.2	N	13.2	256
0.04	45.61	1	140	NE	52	1	167	E	30	27.84	121.1	SE	22.5	21
0.05	11.7	1	8	S	28	1	8	S	24	4	8	S	0	98
0.05	11.75	1	8	S	24	1	170	E	35	14.02	143.6	SE	17.3	231
0.05	32	1	165	E	25	1	10	S	15	12.95	138.1	SE	11.9	46
0.05	32.45	1	146	NE	23	1	164	E	27	8.55	35.1	NE	21.6	307
0.05	32.6	1	159	E	27	1	175	E	25	7.27	94.5	E	24.7	2
0.05	44.48	1	170	E	32	1	167	E	36	4.34	149.3	SE	12.5	236
0.05	44.63	1	160	E	37	1	145	NE	34	9.19	39.7	NE	33	135
0.05	44.68	1	145	NE	34	1	152	NE	33	3.99	75.7	E	32.2	342
0.05	44.73	1	152	NE	33	1	145	NE	37	5.66	109	E	23.9	194
0.05	44.78	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.05	44.83	1	172	E	26	1	148	NE	32	12.98	100.1	E	24.9	188
0.05	44.88	1	148	NE	32	1	155	NE	28	5.31	114.3	SE	19.1	20
0.05	45.03	1	156	NE	34	1	175	E	16	19.5	143	SE	8.6	50
0.05	45.08	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.05	45.13	1	151	NE	23	1	158	E	33	10.51	170.8	N	8.2	262
0.05	45.28	1	159	E	29	1	165	E	30	3.12	50.8	NE	27.8	323
0.05	45.33	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.05	45.38	1	48	NW	8	1	115	NE	26	23.95	131.6	NW	8	222
0.05	45.43	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.05	45.48	1	141	NE	33	1	152	NE	53	21.3	162.2	N	13.2	256
0.05	45.53	1	152	NE	53	1	140	NE	52	9.57	46.2	NE	51.9	142
0.05	45.68	1	167	E	30	1	158	E	28	4.79	44.9	NE	26.1	138
0.063	8.37	1	132	NE	41	1	137	NE	28	13.3	124.2	SE	6.7	32
0.063	11.72	1	8	S	28	2	177.5	E	29.2	5.18	107.9	E	27.6	197
0.063	32.1	1	10	S	15	1	155	NE	26	16.03	125.2	SE	13.6	214
0.063	32.16	1	155	NE	26	1	141	NE	24	6.23	37.6	NE	23.4	130
0.063	32.35	1	142	NE	24	1	146	NE	23	1.88	88.3	E	19.7	356
0.063	32.54	1	164	E	27	1	159	E	27	2.27	71.5	E	27	162
0.063	32.6	1	159	E	27	1	175	E	25	7.27	94.5	E	24.7	2
0.063	32.92	1	171	E	25	1	179	E	30	6.21	28.3	NE	15.8	301
0.063	44.59	2	163.5	E	36.4	1	145	NE	34	10.89	48.6	NE	33.8	143
0.063	44.65	1	145	NE	34	1	152	NE	33	3.99	75.7	E	32.2	342
0.063	44.72	1	152	NE	33	1	145	NE	37	5.66	109	E	23.9	194
0.063	44.78	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.063	44.84	1	172	E	26	1	148	NE	32	12.98	100.1	E	24.9	188
0.063	44.91	1	148	NE	32	1	155	NE	28	5.31	114.3	SE	19.1	20
0.063	44.97	1	155	NE	28	1	156	NE	34	6.02	159.7	N	2.5	250
0.063	45.03	1	156	NE	34	1	175	E	16	19.5	143	SE	8.6	50
0.063	45.1	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.063	45.16	1	151	NE	23	1	158	E	33	10.51	170.8	N	8.2	262
0.063	45.22	1	158	E	33	1	159	E	29	4.03	152.2	SE	3.8	61
0.063	45.29	1	159	E	29	1	165	E	30	3.12	50.8	NE	27.8	323
0.063	45.35	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.063	45.41	1	48	NW	8	2	129.4	NE	28.9	28.7	144.1	NW	8	234
0.063	45.47	2	129.4	NE	28.9	1	152	NE	53	27.98	166.5	N	18.4	260
0.063	45.54	1	152	NE	53	1	140	NE	52	9.57	46.2	NE	51.9	142
0.063	45.6	1	140	NE	52	1	167	E	30	27.84	121.1	SE	22.5	21
0.063	45.66	1	167	E	30	1	158	E	28	4.79	44.9	NE	26.1	138
0.079	8	1	142	NE	30	1	162	E	41	15.88	13.1	N	24.2	287
0.079	8.4	1	132	NE	41	1	137	NE	28	13.3	124.2	SE	6.7	32
0.079	11.73	2	8	E	26	1	170	E	35	12.74	137.5	SE	20.6	225
0.079	31.99	1	165	E	25	1	10	S	15	12.95	138.1	SE	11.9	46
0.079	32.07	1	10	S	15	1	155	NE	26	16.03	125.2	SE	13.6	214
0.079	32.15	1	155	NE	26	1	141	NE	24	6.23	37.6	NE	23.4	130
0.079	32.39	1	142	NE	24	1	146	NE	23	1.88	88.3	E	19.7	356
0.079	32.47	1	146	NE	23	1	164	E	27	8.55	35.1	NE	21.6	307

0.1	32.25	1	141	NE	24	1	142	NE	24	0.41	51.5	NE	24	321
0.1	32.35	1	142	NE	24	1	146	NE	23	1.88	88.3	E	19.7	356
0.1	32.45	1	146	NE	23	1	164	E	27	8.55	35.1	NE	21.6	307
0.1	32.55	1	164	E	27	2	166.7	E	25.8	1.71	123.8	SE	18.2	30
0.1	32.65	2	166.7	E	25.8	1	155	NE	23	5.57	38.7	NE	20.8	131
0.1	32.95	1	171	E	25	1	179	E	30	6.21	28.3	NE	15.8	301
0.1	34.25	1	158	E	33	1	55	NW	24	44.25	8.1	N	18	103
0.1	44.55	2	168.4	E	34	2	152.8	NE	35.3	8.96	80.4	E	34	170
0.1	44.65	2	152.8	NE	35.3	1	152	NE	33	2.31	161.4	N	6.1	74
0.1	44.75	1	152	NE	33	2	156.3	NE	30.8	3.17	112.5	SE	22.4	18
0.1	44.85	2	156.3	NE	30.8	2	151.3	NE	30	2.69	42.7	NE	28.6	137
0.1	44.95	2	151.3	NE	30	2	162.2	E	24.7	7.23	116.1	SE	18.4	23
0.1	45.05	2	162.2	E	24.7	1	151	NE	23	4.86	44.1	NE	22.1	137
0.1	45.15	1	151	NE	23	2	158.5	E	31	8.67	175.5	N	10	267
0.1	45.25	2	158.5	E	31	1	165	E	30	3.46	91	E	29	358
0.1	45.35	1	165	E	30	3	121.5	NE	20.1	20.29	23.9	NE	19.9	118
0.1	45.45	3	121.5	NE	20.1	1	152	NE	53	36.71	162.4	N	13.5	254
0.1	45.55	1	152	NE	53	2	150.4	NE	40.2	12.8	154.8	NW	3.7	67
0.1	45.65	2	150.4	NE	40.2	1	158	E	28	12.94	138.1	SE	10.3	44
0.126	8	1	142	NE	30	1	162	E	41	15.88	13.1	N	24.2	287
0.126	8.13	1	162	E	41	1	166	E	22	19.11	158.5	S	3	67
0.126	8.25	1	166	E	22	1	132	NE	41	25.38	109.1	E	18.7	197
0.126	8.38	1	132	NE	41	1	137	NE	28	13.3	124.2	SE	6.7	32
0.126	8.5	1	137	NE	28	1	134	NE	35	7.17	124.7	SE	6.5	213
0.126	11.78	2	8	E	26	1	170	E	35	12.74	137.5	SE	20.6	225
0.126	32.05	1	165	E	25	2	167.9	E	19.7	5.42	155.7	SE	4.3	65
0.126	32.17	2	167.9	E	19.7	1	141	NE	24	10.77	89	E	19.3	178
0.126	32.3	1	141	NE	24	2	144	NE	23.5	1.3	77.7	E	21.7	345
0.126	32.42	2	144	NE	23.5	1	164	E	27	9.19	39.8	NE	22.8	311
0.126	32.55	1	164	E	27	2	166.7	E	25.8	1.71	123.8	SE	18.2	30
0.126	32.67	2	166.7	E	25.8	1	155	NE	23	5.57	38.7	NE	20.8	131
0.126	32.8	1	155	NE	23	1	171	E	25	6.79	54.5	NE	22.7	325
0.126	32.93	1	171	E	25	1	179	E	30	6.21	28.3	NE	15.8	301
0.126	34.31	1	158	E	33	1	55	NW	24	44.25	8.1	N	18	103
0.126	44.51	1	170	E	32	2	163.5	E	36.4	5.77	132.3	SE	20.9	218
0.126	44.63	2	163.5	E	36.4	2	148.5	NE	33.5	9.08	43	NE	32.5	139
0.126	44.76	2	148.5	NE	33.5	3	153.4	NE	31.2	3.5	106.4	E	23.9	12
0.126	44.89	3	153.4	NE	31.2	2	155.5	NE	31	1.11	74.5	E	30.7	345
0.126	45.01	2	155.5	NE	31	2	160.9	E	19.1	12.09	148.3	SE	4.3	57
0.126	45.14	2	160.9	E	19.1	2	158.5	E	31	11.92	155.2	SE	2	245
0.126	45.26	2	158.5	E	31	2	149.2	NE	13.7	17.56	164.8	N	3.8	76
0.126	45.39	2	149.2	NE	13.7	2	129.4	NE	28.9	16.54	115	SE	7.8	204
0.126	45.52	2	129.4	NE	28.9	3	150.9	NE	44.7	20.25	173.8	N	21.1	268
0.126	45.64	3	150.9	NE	44.7	1	158	E	28	17.24	142.9	SE	7.9	50
0.158	8.04	1	142	NE	30	2	163.5	E	31.5	11.02	53.9	NE	30	324
0.158	8.19	2	163.5	E	31.5	1	132	NE	41	20.63	89.3	E	30.5	177
0.158	8.35	1	132	NE	41	1	137	NE	28	13.3	124.2	SE	6.7	32
0.158	8.51	1	137	NE	28	1	134	NE	35	7.17	124.7	SE	6.5	213
0.158	11.52	1	172	E	29	1	8	S	28	7.68	98.4	E	28	6
0.158	11.68	1	8	S	28	2	177.5	E	29.2	5.18	107.9	E	27.6	197
0.158	32.13	2	174.4	E	19.6	2	148.3	NE	24.8	11.08	100.7	E	18.9	190
0.158	32.29	2	148.3	NE	24.8	2	144	NE	23.5	2.22	16.1	N	18.9	110
0.158	32.44	2	144	NE	23.5	2	161.5	E	27	8.22	35.6	NE	22.4	307
0.158	32.6	2	161.5	E	27	2	165.4	E	23.7	3.7	138.9	SE	11.1	46
0.158	32.76	2	165.4	E	23.7	1	171	E	25	2.66	46	NE	20.9	319
0.158	32.92	1	171	E	25	1	179	E	30	6.21	28.3	NE	15.8	301
0.158	44.49	1	170	E	32	2	163.5	E	36.4	5.77	132.3	SE	20.9	218
0.158	44.65	2	163.5	E	36.4	4	152.2	NE	32.1	7.69	28.3	NE	27.5	125
0.158	44.81	4	152.2	NE	32.1	2	151.3	NE	30	2.2	162	N	6.1	74
0.158	44.96	2	151.3	NE	30	3	158.6	E	24.1	6.76	128.2	SE	12.7	35
0.158	45.12	3	158.6	E	24.1	2	158.5	E	31	6.95	158.1	S	0.2	248
0.158	45.28	2	158.5	E	31	3	132.1	NE	17.3	17.13	1.7	N	13.3	95
0.158	45.44	3	132.1	NE	17.3	3	145.3	NE	45.9	29.24	150.9	NW	5.7	242
0.158	45.6	3	145.3	NE	45.9	2	162.6	E	28.9	19.82	127.2	SE	17.8	30
0.2	2.1	1	180	E	32	1	165	E	37	9.83	117.8	SE	28.9	204
0.2	7.49	1	86	N	33	1	125	NE	32	20.69	18.6	N	30.9	285
0.2	8.09	2	153.4	NE	35.1	1	166	E	22	14.35	137.4	SE	11	44
0.2	8.29	1	166	E	22	2	134.1	NE	34.5	19.21	102.2	E	19.9	191
0.2	8.49	2	134.1	NE	34.5	1	134	NE	35	0.53	129.7	SE	3	218
0.2	11.48	1	172	E	29	1	8	S	28	7.68	98.4	E	28	6
0.2	11.68	1	8	S	28	2	177.5	E	29.2	5.18	107.9	E	27.6	197
0.2	32.03	1	165	E	25	3	157.7	E	20.7	5.18	12.6	N	12.2	105
0.2	32.23	3	157.7	E	20.7	2	144	NE	23.5	5.85	91.2	E	19.1	180
0.2	32.43	2	144	NE	23.5	2	161.5	E	27	8.22	35.6	NE	22.4	307
0.2	32.63	2	161.5	E	27	2	165.4	E	23.7	3.7	138.9	SE	11.1	46
0.2	32.83	2	165.4	E	23.7	2	175.3	E	27.4	5.7	36.2	NE	18.8	309
0.2	34.03	1	143	NE	22	1	158	E	33	12.92	180	N	13.7	272
0.2	34.23	1	158	E	33	1	55	NW	24	44.25	8.1	N	18	103
0.2	44.6	3	165.5	E	34.9	4	152.2	NE	32.1	7.86	44.2	NE	30.8	139

0.316	11.63	1	172	E	29	3	0.9	E	28.7	4.31	91	E	28.7	360
0.316	12.89	1	165	E	35	1	173	E	30	6.58	133	SE	20.4	38
0.316	17.64	1	4	S	18	1	176	E	13	5.43	22.5	N	5.9	113
0.316	32.18	3	166.7	E	21.5	4	148.7	NE	24.2	7.48	90.3	E	20.9	179
0.316	32.5	4	148.7	NE	24.2	3	163.1	E	24.8	5.99	60	NE	24.2	330
0.316	32.82	3	163.1	E	24.8	2	175.3	E	27.4	6.01	50.3	NE	23	323
0.316	33.76	1	139	NE	21	1	143	NE	22	1.77	14.8	N	17.6	287
0.316	34.08	1	143	NE	22	2	116.8	NE	19	9.56	20.7	N	18.9	113
0.316	44.52	1	170	E	32	6	156.2	NE	33.4	7.56	86	E	31.9	175
0.316	44.83	6	156.2	NE	33.4	5	155.3	NE	26.4	7.04	159.2	N	2	69
0.316	45.15	5	155.3	NE	26.4	6	145.8	NE	24.5	4.5	33.5	NE	22.9	126
0.316	45.47	6	145.8	NE	24.5	4	152.4	NE	40.3	16.17	159.9	N	6.4	251
0.398	1.95	1	180	E	32	1	165	E	37	9.83	117.8	SE	28.9	204
0.398	5.54	1	135	NE	36	1	112	N	15	22.86	147.3	NW	8.8	60
0.398	7.53	1	86	N	33	1	125	NE	32	20.69	18.6	N	30.9	285
0.398	7.93	1	125	NE	32	3	156.4	NE	30.6	16.24	56.4	NE	30.2	323
0.398	8.32	3	156.4	NE	30.6	3	134.1	NE	34.6	12.66	76.8	E	30.2	165
0.398	8.72	3	134.1	NE	34.6	1	173	E	18	23.21	109.1	E	16.3	15
0.398	10.71	1	133	NE	39	1	33	S	29	42.89	95.6	E	26.2	358
0.398	11.11	1	33	S	29	1	172	E	29	19.55	102.5	E	27.4	195
0.398	11.51	1	172	E	29	3	0.9	E	28.7	4.31	91	E	28.7	360
0.398	13.1	1	165	E	35	1	173	E	30	6.58	133	SE	20.4	38
0.398	13.5	1	173	E	30	1	155	NE	34	10.3	100.1	E	28.9	188
0.398	32.21	4	159.8	E	21.7	4	153.3	NE	25	4.13	120.4	SE	14.2	209
0.398	32.61	4	153.3	NE	25	4	170.7	E	25.5	7.42	67.8	E	24.9	337
0.398	33.8	1	139	NE	21	1	143	NE	22	1.77	14.8	N	17.6	287
0.398	34.2	1	143	NE	22	2	116.8	NE	19	9.56	20.7	N	18.9	113
0.398	44.55	2	168.4	E	34	7	153.2	NE	32.1	8.49	56.1	NE	31.9	149
0.398	44.95	7	153.2	NE	32.1	6	159.7	E	27.4	5.74	125.9	SE	16.1	32
0.398	45.35	6	159.7	E	27.4	7	144.1	NE	31.2	8.52	91.6	E	25.7	179
0.501	5.81	1	135	NE	36	1	112	N	15	22.86	147.3	NW	8.8	60
0.501	6.32	1	112	N	15	1	179	E	26	24.15	31.8	NE	14.8	301
0.501	7.82	2	105.2	N	31	3	156.4	NE	30.6	25.56	41.8	NE	28.2	308
0.501	8.32	3	156.4	NE	30.6	3	134.1	NE	34.6	12.66	76.8	E	30.2	165
0.501	8.82	3	134.1	NE	34.6	1	173	E	18	23.21	109.1	E	16.3	15
0.501	10.33	1	134	NE	21	1	133	NE	39	18.01	132.1	SE	0.7	222
0.501	10.83	1	133	NE	39	1	33	S	29	42.89	95.6	E	26.2	358
0.501	11.33	1	33	S	29	4	178.7	E	28.7	16.39	104.8	E	27.8	197
0.501	12.83	1	165	E	35	1	173	E	30	6.58	133	SE	20.4	38
0.501	13.33	1	173	E	30	1	155	NE	34	10.3	100.1	E	28.9	188
0.501	17.84	1	4	S	18	1	176	E	13	5.43	22.5	N	5.9	113
0.501	18.34	1	176	E	13	1	165	E	20	7.64	147.2	SE	6.3	237
0.501	32.38	5	155.9	NE	22	5	160.1	E	24.7	3.14	8	N	12.1	279
0.501	32.88	5	160.1	E	24.7	2	175.3	E	27.4	7.2	53.3	NE	23.8	325
0.501	33.38	2	175.3	E	27.4	1	139	NE	21	15.94	42.6	NE	20.9	136
0.501	33.88	1	139	NE	21	3	128.3	NE	19.8	3.91	24.9	NE	19.3	116
0.501	44.91	8	156.9	NE	33	8	156.9	NE	24.1	8.81	156.9	SE	0	67
0.501	45.41	8	156.9	NE	24.1	6	146.2	NE	36	12.95	129.8	SE	11.5	218
0.631	4.24	1	1	S	43	1	2	S	35	8.02	178	S	2.8	87
0.631	4.87	1	2	S	35	1	135	NE	36	26.79	70.9	E	33.2	164
0.631	5.5	1	135	NE	36	1	112	N	15	22.86	147.3	NW	8.8	60
0.631	6.13	1	112	N	15	1	179	E	26	24.15	31.8	NE	14.8	301
0.631	6.77	1	179	E	26	1	86	N	33	42.16	50.2	NE	20.8	143
0.631	7.4	1	86	N	33	2	133.3	NE	30.7	24.52	25.4	NE	29.5	291
0.631	8.03	2	133.3	NE	30.7	5	145	NE	32.6	6.41	29.6	NE	30	301
0.631	8.66	5	145	NE	32.6	1	173	E	18	18.51	121.5	SE	14.3	28
0.631	9.29	1	173	E	18	1	134	NE	21	13.11	76.7	E	17.9	167
0.631	9.92	1	134	NE	21	1	133	NE	39	18.01	132.1	SE	0.7	222
0.631	10.55	1	133	NE	39	1	33	S	29	42.89	95.6	E	26.2	358
0.631	11.18	1	33	S	29	4	178.7	E	28.7	16.39	104.8	E	27.8	197
0.631	13.08	1	165	E	35	1	173	E	30	6.58	133	SE	20.4	38
0.631	13.71	1	173	E	30	1	155	NE	34	10.3	100.1	E	28.9	188
0.631	14.34	1	155	NE	34	1	155	NE	35	1	155	SE	0	245
0.631	17.49	1	4	S	18	1	176	E	13	5.43	22.5	N	5.9	113
0.631	18.12	1	176	E	13	1	165	E	20	7.64	147.2	SE	6.3	237
0.631	32	1	165	E	25	7	154.9	NE	23.1	4.5	43.8	NE	21.7	136
0.631	32.63	7	154.9	NE	23.1	4	170.7	E	25.5	6.89	51.5	NE	22.6	322
0.631	33.27	4	170.7	E	25.5	1	139	NE	21	13.12	44.1	NE	20.9	137
0.631	33.9	1	139	NE	21	3	128.3	NE	19.8	3.91	24.9	NE	19.3	116
0.631	44.62	3	165.5	E	34.9	11	154.7	NE	29.3	8.01	21.1	N	22.1	117
0.631	45.25	11	154.7	NE	29.3	8	146.8	NE	30.9	4.22	85.2	E	27.7	173
0.794	2.2	1	180	E	32	1	165	E	37	9.83	117.8	SE	28.9	204
0.794	3	1	165	E	37	1	1	S	43	11.87	45.9	NE	33.4	321
0.794	3.79	1	1	S	43	1	2	S	35	8.02	178	S	2.8	87
0.794	6.17	2	128	NE	25.1	1	179	E	26	21.42	61.1	NE	23.3	329
0.794	6.97	1	179	E	26	2	105.2	N	31	33.53	60	NE	23.1	152
0.794	7.76	2	105.2	N	31	5	146.9	NE	31.6	21.31	34.1	NE	29.6	302
0.794	8.56	5	146.9	NE	31.6	2	147.4	NE	25.3	6.35	145	SE	1.2	55
0.794	9.35	2	147.4	NE	25.3	1	134	NE	21	6.79	9.4	N	17.5	102

1.259	0.82	1	159	E	25	1	180	E	32	12.13	41.4	NE	22.5	314
1.259	2.08	1	180	E	32	1	165	E	37	9.83	117.8	SE	28.9	204
1.259	3.34	1	165	E	37	2	1.5	E	39	10.3	69.3	E	36.9	340
1.259	4.6	2	1.5	E	39	1	135	NE	36	27.93	61	NE	34.9	157
1.259	5.86	1	135	NE	36	2	155.2	NE	17.6	20.33	120.8	SE	10.1	27
1.259	7.12	2	155.2	NE	17.6	6	135.7	NE	30.6	15.1	115.8	SE	11.3	204
1.259	8.38	6	135.7	NE	30.6	3	143.6	NE	26.2	5.78	102.7	E	17.8	9
1.259	9.64	3	143.6	NE	26.2	3	156.1	NE	24.5	5.62	78.9	E	23.9	347
1.259	10.9	3	156.1	NE	24.5	4	178.7	E	28.7	10.86	52.5	NE	23.9	324
1.259	12.15	4	178.7	E	28.7	2	168.7	E	32.4	6.26	124.1	SE	24.1	210
1.259	13.41	2	168.7	E	32.4	2	155	NE	34.5	7.83	89.9	E	31.9	178
1.259	18.45	2	0.6	E	15.5	1	165	E	20	6.54	127.6	SE	12.5	216
1.259	19.71	1	165	E	20	1	151	NE	28	9.77	124.7	SE	13.2	213
1.259	31.04	1	145	NE	34	4	159.8	E	21.7	13.99	125.6	SE	12.6	32
1.259	32.3	4	159.8	E	21.7	8	162.1	E	25	3.36	175.5	N	6.2	266
1.259	33.56	8	162.1	E	25	4	131.5	NE	20.1	12.51	33.1	NE	19.9	126
1.259	44.89	8	156.9	NE	33	14	151.5	NE	29	4.83	5.3	N	17.2	99
1.585	1.46	1	159	E	25	2	172	E	34.3	11.24	16.8	N	16	289
1.585	3.04	2	172	E	34.3	2	1.5	E	39	7.34	40.5	NE	27	316
1.585	4.63	2	1.5	E	39	2	128	NE	25.1	30.37	36.8	NE	25.1	134
1.585	6.21	2	128	NE	25.1	3	125.2	NE	25.3	1.2	48	NE	24.8	136
1.585	7.8	3	125.2	NE	25.3	7	147	NE	29.9	10.96	19.5	N	24.5	291
1.585	9.38	7	147	NE	29.9	3	156.1	NE	24.5	6.8	116.7	SE	16.1	23
1.585	10.97	3	156.1	NE	24.5	4	178.7	E	28.7	10.86	52.5	NE	23.9	324
1.585	12.55	4	178.7	E	28.7	3	164	E	32.8	8.49	113.5	SE	26.4	201
1.585	14.14	3	164	E	32.8	1	155	NE	35	5.49	97.3	E	30.6	184
1.585	18.89	3	174.5	E	16.8	1	151	NE	28	14.13	125.6	SE	12.9	214
1.585	31.57	1	145	NE	34	12	161.4	E	23.9	12.76	118.4	SE	16.8	24
1.585	33.16	12	161.4	E	23.9	4	131.5	NE	20.1	11.66	36.8	NE	20	129
1.995	1.9	1	159	E	25	3	175.4	E	37.1	14.67	18.5	N	16.5	291
1.995	3.9	3	175.4	E	37.1	3	149.4	NE	25.9	17.4	29.1	NE	22.8	125
1.995	5.9	3	149.4	NE	25.9	3	125.2	NE	25.3	10.39	43.8	NE	25.1	135
1.995	7.89	3	125.2	NE	25.3	8	145.7	NE	28.7	9.82	23.9	NE	24.9	294
1.995	9.89	8	145.7	NE	28.7	6	175.5	E	28.2	14.07	72.7	E	27.6	341
1.995	11.88	6	175.5	E	28.2	3	164	E	32.8	7.4	122	SE	23.3	209
1.995	13.88	3	164	E	32.8	1	155	NE	35	5.49	97.3	E	30.6	184
1.995	15.87	1	155	NE	35	1	4	S	18	20.92	134.3	SE	13.9	40
1.995	17.87	1	4	S	18	2	169.4	E	16.4	4.59	66	NE	16	157
1.995	19.86	2	169.4	E	16.4	1	151	NE	28	13.36	130.8	SE	10.4	220
1.995	29.84	1	161	E	17	1	145	NE	34	18.2	132.5	SE	8.3	221
1.995	31.83	1	145	NE	34	13	159.8	E	23.6	12.57	121.1	SE	15.3	27
1.995	33.83	13	159.8	E	23.6	3	128.3	NE	19.8	12.09	35.4	NE	19.8	127
2.512	1.5	1	159	E	25	3	175.4	E	37.1	14.67	18.5	N	16.5	291
2.512	4.02	3	175.4	E	37.1	3	149.4	NE	25.9	17.4	29.1	NE	22.8	125
2.512	6.53	3	149.4	NE	25.9	9	139.6	NE	29.7	5.89	97.5	E	20.9	185
2.512	9.04	9	139.6	NE	29.7	5	163.3	E	23.8	12.05	92.7	E	22.6	359
2.512	11.55	5	163.3	E	23.8	6	171.9	E	30.5	7.74	15.4	N	13.2	288
2.512	14.06	6	171.9	E	30.5	1	155	NE	35	10.17	103.6	E	28.7	191
2.512	16.58	1	155	NE	35	3	174.5	E	16.8	19.85	141.3	SE	9.4	49
2.512	19.09	3	174.5	E	16.8	1	151	NE	28	14.13	125.6	SE	12.9	214
2.512	26.62	1	148	NE	17	1	161	E	17	3.79	64.5	NE	16.9	334
2.512	29.13	1	161	E	17	1	145	NE	34	18.2	132.5	SE	8.3	221
2.512	31.65	1	145	NE	34	14	158.7	E	23.4	12.42	123	SE	14.2	29
2.512	34.16	14	158.7	E	23.4	2	116.8	NE	19	15.41	31.1	NE	18.9	124
3.162	2.3	3	168.5	E	31.1	2	1.5	E	39	10.86	32.7	NE	22.8	307
3.162	5.46	2	1.5	E	39	11	137.7	NE	28.8	25.84	44.1	NE	28.7	141
3.162	8.62	11	137.7	NE	28.8	8	171.1	E	25.4	15.41	77.9	E	25.4	345
3.162	11.79	8	171.1	E	25.4	4	161.7	E	33.3	9.09	139	SE	14.2	227
3.162	14.95	4	161.7	E	33.3	2	0.6	E	15.5	19.25	148.8	SE	8.3	56
3.162	18.11	2	0.6	E	15.5	2	156.9	NE	23.8	11.42	126.4	SE	12.7	215
3.162	27.6	1	148	NE	17	2	150.5	NE	25.3	8.35	155	NW	2.1	245
3.162	30.76	2	150.5	NE	25.3	14	158.7	E	23.4	3.89	96.2	E	21	4
3.162	33.92	14	158.7	E	23.4	2	116.8	NE	19	15.41	31.1	NE	18.9	124
3.981	2.95	3	168.5	E	31.1	5	164.4	E	28.6	3.14	22.4	N	18.6	116
3.981	6.93	5	164.4	E	28.6	12	141.7	NE	27.8	10.71	58.3	NE	27.7	150
3.981	10.91	12	141.7	NE	27.8	8	169.6	E	30.7	13.81	52.2	NE	27.8	322
3.981	14.89	8	169.6	E	30.7	3	174.5	E	16.8	14.04	164.5	S	3	74
3.981	18.87	3	174.5	E	16.8	1	151	NE	28	14.13	125.6	SE	12.9	214
3.981	22.86	1	151	NE	28	1	148	NE	17	11.06	155	NW	2.1	66
3.981	26.84	1	148	NE	17	2	150.5	NE	25.3	8.35	155	NW	2.1	245
3.981	30.82	2	150.5	NE	25.3	16	155.5	NE	22.7	3.33	117.6	SE	14.4	25
5.012	2.81	3	168.5	E	31.1	7	147.3	NE	26.6	11.09	41.6	NE	25.7	136
5.012	7.82	7	147.3	NE	26.6	15	158.6	E	28.2	5.46	43.4	NE	25.9	315
5.012	12.83	15	158.6	E	28.2	4	164.2	E	28.8	2.73	56.8	NE	27.7	328
5.012	17.84	4	164.2	E	28.8	3	161.1	E	20	8.88	170.2	N	3.3	81
5.012	22.86	3	161.1	E	20	1	148	NE	17	5.13	26.9	NE	14.7	119
5.012	27.87	1	148	NE	17	12	156.8	NE	23.7	7.3	175.8	N	8.1	267
5.012	32.88	12	156.8	NE	23.7	6	150.1	NE	21.4	3.37	20.4	N	16.8	112
6.31	3.93	4	172.3	E	33.9	14	142.9	NE	27.1	16.24	40.4	NE	26.6	136

Section III

window size (m)	elevation between two consecutive windows (m)	lower window number of measures	average orientation			upper window number of measures	average orientation			tilt angle (°)	tilt axis			tilt way (°)
0.02	56.1	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.025	55.46	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.025	56.11	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.032	55.46	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.032	55.75	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.032	55.94	1	159	E	29	1	165	E	30	3.12	50.8	NE	27.8	323
0.032	56.1	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.04	55.16	1	170	E	32	1	167	E	36	4.34	149.3	SE	12.5	236
0.04	55.28	1	160	E	37	1	145	NE	34	9.19	39.7	NE	33	135
0.04	55.4	1	152	NE	33	1	145	NE	37	5.66	109	E	23.9	194
0.04	55.44	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.04	55.64	1	155	NE	28	1	156	NE	34	6.02	159.7	N	2.5	250
0.04	55.76	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.04	55.88	1	158	E	33	1	159	E	29	4.03	152.2	SE	3.8	61
0.04	56	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.04	56.12	1	115	NE	26	1	141	NE	33	14.45	6.4	N	24.8	278
0.04	56.16	1	141	NE	33	1	152	NE	53	21.3	162.2	N	13.2	256
0.04	56.28	1	140	NE	52	1	167	E	30	27.84	121.1	SE	22.5	21
0.05	11.43	1	178	E	33	1	180	E	22	11.04	174.7	S	2.1	84
0.05	11.78	1	177	E	53	1	8	S	29	24.98	169.3	S	10.1	74
0.05	12.03	1	150	NE	28	1	158	E	11	17.17	145.4	SE	2.4	55
0.05	55.18	1	170	E	32	1	167	E	36	4.34	149.3	SE	12.5	236
0.05	55.23	1	167	E	36	1	160	E	37	4.28	90.1	E	35.3	178
0.05	55.28	1	160	E	37	1	145	NE	34	9.19	39.7	NE	33	135
0.05	55.43	1	152	NE	33	2	156.3	NE	30.8	3.17	112.5	SE	22.4	18
0.05	55.58	1	148	NE	32	1	155	NE	28	5.31	114.3	SE	19.1	20
0.05	55.63	1	155	NE	28	1	156	NE	34	6.02	159.7	N	2.5	250
0.05	55.68	1	156	NE	34	1	175	E	16	19.5	143	SE	8.6	50
0.05	55.73	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.05	55.88	1	158	E	33	1	159	E	29	4.03	152.2	SE	3.8	61
0.05	55.93	1	159	E	29	1	165	E	30	3.12	50.8	NE	27.8	323
0.05	55.98	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.05	56.23	1	152	NE	53	1	140	NE	52	9.57	46.2	NE	51.9	142
0.05	56.28	1	140	NE	52	1	167	E	30	27.84	121.1	SE	22.5	21
0.05	56.33	1	167	E	30	1	158	E	28	4.79	44.9	NE	26.1	138
0.063	11.34	1	152	NE	25	1	178	E	33	14.77	39.6	NE	23.3	312
0.063	11.53	1	180	E	22	1	163	E	41	20.81	149.3	SE	11.7	237
0.063	11.6	1	163	E	41	1	162	E	32	9.02	165.6	N	2.2	76
0.063	11.79	1	177	E	53	1	8	S	29	24.98	169.3	S	10.1	74
0.063	11.85	1	8	S	29	1	180	E	42	13.78	167.6	S	10.9	255
0.063	12.04	1	150	NE	28	1	158	E	11	17.17	145.4	SE	2.4	55
0.063	12.1	1	158	E	11	1	154	NE	25	14.05	151.2	SE	1.3	241
0.063	55.26	1	167	E	36	2	152.8	NE	35.3	8.3	63.7	NE	35.3	156
0.063	55.32	2	152.8	NE	35.3	1	152	NE	33	2.31	161.4	N	6.1	74
0.063	55.38	1	152	NE	33	1	145	NE	37	5.66	109	E	23.9	194
0.063	55.45	1	145	NE	37	1	172	E	26	17.66	110.2	E	23.3	14
0.063	55.51	1	172	E	26	1	148	NE	32	12.98	100.1	E	24.9	188
0.063	55.57	1	148	NE	32	1	155	NE	28	5.31	114.3	SE	19.1	20
0.063	55.64	1	155	NE	28	1	156	NE	34	6.02	159.7	N	2.5	250
0.063	55.7	1	156	NE	34	1	175	E	16	19.5	143	SE	8.6	50
0.063	55.76	1	175	E	16	1	151	NE	23	10.51	115.3	SE	13.9	204
0.063	55.83	1	151	NE	23	1	158	E	33	10.51	170.8	N	8.2	262
0.063	55.89	1	158	E	33	1	159	E	29	4.03	152.2	SE	3.8	61
0.063	55.95	1	159	E	29	1	165	E	30	3.12	50.8	NE	27.8	323
0.063	56.02	1	165	E	30	1	48	NW	8	34.31	176.1	N	6.3	88
0.063	56.08	1	48	NW	8	2	129.4	NE	28.9	28.7	144.1	NW	8	234
0.063	56.14	2	129.4	NE	28.9	1	152	NE	53	27.98	166.5	N	18.4	260
0.063	56.2	1	152	NE	53	1	140	NE	52	9.57	46.2	NE	51.9	142
0.063	56.27	1	140	NE	52	1	167	E	30	27.84	121.1	SE	22.5	21
0.063	56.33	1	167	E	30	1	158	E	28	4.79	44.9	NE	26.1	138
0.079	0.07	1	2	S	40	1	173	E	37	6.35	53.2	NE	33.2	150
0.079	0.47	1	159	E	29	1	170	E	37	9.97	16.8	N	18.8	291
0.079	0.71	1	162	E	30	1	168	E	37	7.74	6.6	N	13.5	280
0.079	11.35	1	152	NE	25	1	178	E	33	14.77	39.6	NE	23.3	312
0.079	11.43	1	178	E	33	1	180	E	22	11.04	174.7	S	2.1	84
0.079	11.51	1	180	E	22	1	163	E	41	20.81	149.3	SE	11.7	237
0.079	11.59	1	163	E	41	1	162	E	32	9.02	165.6	N	2.2	76
0.079	11.67	1	162	E	32	1	177	E	53	23.2	9.6	N	16.1	284
0.079	11.75	1	177	E	53	1	8	S	29	24.98	169.3	S	10.1	74
0.079	11.83	1	8	S	29	1	180	E	42	13.78	167.6	S	10.9	255
0.079	11.91	1	180	E	42	1	150	NE	28	21.84	31.1	NE	25	129
0.079	11.99	1	150	NE	28	1	158	E	11	17.17	145.4	SE	2.4	55
0.079	12.22	1	154	NE	25	1	1	W	9	33.25	160.8	N	3.1	71
0.079	43.28	1	148	NE	19	1	163	E	26	9	12.9	N	13.7	284

0.1	12.09	1	158	E	11	1	154	NE	25	14.05	151.2	SE	1.3	241
0.1	12.19	1	154	NE	25	1	1	W	9	33.25	160.8	N	3.1	71
0.1	23.49	1	145	NE	39	1	142	NE	24	15.08	148.7	NW	3	60
0.1	24.09	1	140	NE	22	1	148	NE	25	4.37	8.3	N	16.8	280
0.1	42.19	1	156	NE	18	1	152	NE	22	4.23	136.2	SE	6.3	225
0.1	42.99	1	154	NE	24	1	153	NE	22	2.04	163.7	N	4.3	75
0.1	43.29	1	148	NE	19	1	163	E	26	9	12.9	N	13.7	284
0.1	55.19	1	170	E	32	2	163.5	E	36.4	5.77	132.3	SE	20.9	218
0.1	55.29	2	163.5	E	36.4	2	148.5	NE	33.5	9.08	43	NE	32.5	139
0.1	55.39	2	148.5	NE	33.5	2	156.3	NE	30.8	4.95	99	E	26.7	5
0.1	55.49	2	156.3	NE	30.8	1	148	NE	32	4.5	80	E	30.1	168
0.1	55.59	1	148	NE	32	2	155.5	NE	31	4.06	78.3	E	30.4	345
0.1	55.69	2	155.5	NE	31	2	160.9	E	19.1	12.09	148.3	SE	4.3	57
0.1	55.79	2	160.9	E	19.1	1	158	E	33	13.94	154.7	SE	2.1	244
0.1	55.89	1	158	E	33	2	162	E	29.5	4.11	133.1	SE	15.3	39
0.1	55.99	2	162	E	29.5	2	100.4	N	15.1	25.64	10.5	N	15.1	104
0.1	56.09	2	100.4	N	15.1	2	147.5	NE	42.9	34.1	162.4	N	13.4	253
0.1	56.19	2	147.5	NE	42.9	1	140	NE	52	10.67	121.3	SE	22.3	204
0.1	56.29	1	140	NE	52	2	162.6	E	28.9	27.05	124.6	SE	18.8	26
0.126	0.12	1	2	S	40	1	173	E	37	6.35	53.2	NE	33.2	150
0.126	0.24	1	173	E	37	1	166	E	29	8.85	11.4	N	13.4	106
0.126	0.37	1	166	E	29	1	159	E	29	3.39	72.5	E	29	163
0.126	0.49	1	159	E	29	1	170	E	37	9.97	16.8	N	18.8	291
0.126	0.62	1	170	E	37	1	162	E	30	8.26	13.8	N	16.9	109
0.126	0.75	1	162	E	30	1	168	E	37	7.74	6.6	N	13.5	280
0.126	11.32	1	152	NE	25	1	178	E	33	14.77	39.6	NE	23.3	312
0.126	11.45	1	178	E	33	2	169.2	E	31.2	5.01	59.8	NE	29.8	153
0.126	11.57	2	169.2	E	31.2	1	162	E	32	3.83	88.9	E	30.9	178
0.126	11.7	1	162	E	32	2	1.2	E	40.9	14.34	37.8	NE	27.3	312
0.126	11.82	2	1.2	E	40.9	1	180	E	42	1.36	153.6	SE	21.8	235
0.126	11.95	1	180	E	42	2	152.3	NE	19.5	26.09	15.6	N	13.6	111
0.126	12.08	2	152.3	NE	19.5	1	154	NE	25	5.57	159.3	N	2.5	250
0.126	12.2	1	154	NE	25	1	1	W	9	33.25	160.8	N	3.1	71
0.126	12.33	1	1	W	9	1	176	E	47	55.97	176.6	N	0.7	267
0.126	13.21	1	176	E	47	1	13	S	73	29.75	20.9	N	24.3	300
0.126	24.04	1	140	NE	22	1	148	NE	25	4.37	8.3	N	16.8	280
0.126	40.02	1	165	E	23	1	166	E	25	2.04	176	N	4.6	267
0.126	42.16	1	156	NE	18	1	152	NE	22	4.23	136.2	SE	6.3	225
0.126	42.79	1	151	NE	24	1	154	NE	24	1.22	62.5	NE	24	332
0.126	43.17	1	153	NE	22	1	148	NE	19	3.47	179.2	N	10.1	91
0.126	43.3	1	148	NE	19	1	163	E	26	9	12.9	N	13.7	284
0.126	55.13	1	170	E	32	1	167	E	36	4.34	149.3	SE	12.5	236
0.126	55.26	1	167	E	36	3	152.5	NE	34.5	8.47	57.5	NE	34.4	151
0.126	55.38	3	152.5	NE	34.5	2	156.3	NE	30.8	4.23	129.3	SE	15.2	35
0.126	55.51	2	156.3	NE	30.8	2	151.3	NE	30	2.69	42.7	NE	28.6	137
0.126	55.63	2	151.3	NE	30	2	162.2	E	24.7	7.23	116.1	SE	18.4	23
0.126	55.76	2	162.2	E	24.7	2	155.1	NE	28	4.52	117.1	SE	18.1	205
0.126	55.89	2	155.1	NE	28	2	162	E	29.5	3.67	41.4	NE	25.9	314
0.126	56.01	2	162	E	29.5	3	121.5	NE	20.1	18.9	21.7	N	19.8	116
0.126	56.14	3	121.5	NE	20.1	2	146	NE	52.3	34.8	155	NW	11.4	247
0.126	56.26	2	146	NE	52.3	2	162.6	E	28.9	25.63	134.4	SE	14.7	37
0.158	0.14	2	177.6	E	38.4	1	166	E	29	11.38	21.8	N	17.9	117
0.158	0.3	1	166	E	29	1	159	E	29	3.39	72.5	E	29	163
0.158	0.45	1	159	E	29	1	170	E	37	9.97	16.8	N	18.8	291
0.158	0.61	1	170	E	37	2	165.3	E	33.5	4.46	19.9	N	20.6	116
0.158	11.39	2	166.7	E	28.4	1	180	E	22	8.51	134.3	SE	16.1	41
0.158	11.55	1	180	E	22	2	162.6	E	36.5	16.68	143.7	SE	13.5	232
0.158	11.71	2	162.6	E	36.5	2	1.2	E	40.9	12.38	56.3	NE	35.4	329
0.158	11.87	2	1.2	E	40.9	2	167.7	E	34.1	10.6	38.4	NE	27.7	136
0.158	12.02	2	167.7	E	34.1	2	155.2	NE	18	16.93	178.7	N	7.4	91
0.158	12.18	2	155.2	NE	18	1	1	W	9	26.38	163.6	N	2.7	74
0.158	12.34	1	1	W	9	1	176	E	47	55.97	176.6	N	0.7	267
0.158	13.29	1	176	E	47	1	13	S	73	29.75	20.9	N	24.3	300
0.158	14.72	1	141	NE	14	1	164	E	29	16.94	0.7	N	9	272
0.158	23.44	1	145	NE	39	1	142	NE	24	15.08	148.7	NW	3	60
0.158	24.07	1	140	NE	22	1	148	NE	25	4.37	8.3	N	16.8	280
0.158	39.6	1	148	NE	30	1	133	NE	23	9.64	1.3	N	17.6	95
0.158	40.08	1	165	E	23	1	166	E	25	2.04	176	N	4.6	267
0.158	42.14	1	156	NE	18	1	152	NE	22	4.23	136.2	SE	6.3	225
0.158	42.3	1	152	NE	22	1	153	NE	26	4.02	157.8	N	2.3	248
0.158	42.77	1	151	NE	24	1	154	NE	24	1.22	62.5	NE	24	332
0.158	42.93	1	154	NE	24	1	153	NE	22	2.04	163.7	N	4.3	75
0.158	43.09	1	153	NE	22	1	148	NE	19	3.47	179.2	N	10.1	91
0.158	43.25	1	148	NE	19	1	163	E	26	9	12.9	N	13.7	284
0.158	55.13	1	170	E	32	2	163.5	E	36.4	5.77	132.3	SE	20.9	218
0.158	55.29	2	163.5	E	36.4	3	147.2	NE	34.6	9.58	52.1	NE	34.5	146
0.158	55.45	3	147.2	NE	34.6	3	157.6	E	28.3	8.29	116.2	SE	19.6	21
0.158	55.61	3	157.6	E	28.3	2	162.2	E	24.7	4.13	132.2	SE	13	40
0.158	55.77	2	162.2	E	24.7	3	156.4	NE	28.3	4.41	126.2	SE	15.2	214

0.2	43.25	1	148	NE	19	1	163	E	26	9	12.9	N	13.7	284
0.2	43.85	1	152	NE	22	1	147	NE	23	2.16	89	E	19.8	177
0.2	55.23	2	168.4	E	34	3	152.5	NE	34.5	8.94	74.4	E	33.9	165
0.2	55.43	3	152.5	NE	34.5	4	153.8	NE	30.4	4.21	145.2	SE	5	53
0.2	55.62	4	153.8	NE	30.4	3	158.6	E	24.1	6.67	139	SE	8.5	47
0.2	55.82	3	158.6	E	24.1	3	160.6	E	30.6	6.64	166.7	N	3.6	258
0.2	56.02	3	160.6	E	30.6	4	134.7	NE	27.5	12.85	42	NE	27.5	136
0.2	56.22	4	134.7	NE	27.5	3	152.7	NE	35.8	12.51	8	N	22.6	281
0.251	0.18	2	177.6	E	38.4	2	162.5	E	29	12.59	26.8	NE	21.1	123
0.251	0.43	2	162.5	E	29	2	166.4	E	33.4	4.91	5.4	N	12.1	279
0.251	0.68	2	166.4	E	33.4	1	168	E	37	3.69	179.4	N	8.4	271
0.251	0.94	1	168	E	37	1	151	NE	28	12.75	20.4	N	22	116
0.251	1.19	1	151	NE	28	1	155	NE	39	11.21	162.6	N	6.1	254
0.251	1.94	1	156	NE	48	1	156	NE	29	19	156	NW	0	66
0.251	11.49	3	170.5	E	26.1	3	168.3	E	41.7	15.67	165.7	S	2.3	255
0.251	11.74	3	168.3	E	41.7	3	173.9	E	32	10.27	155.4	SE	11.2	61
0.251	11.99	3	173.9	E	32	3	147.3	NE	9.5	23.89	2.9	N	5.6	94
0.251	12.24	3	147.3	NE	9.5	1	176	E	47	38.87	1	N	5.3	271
0.251	12.49	1	176	E	47	1	169	E	49	5.57	112.3	E	43.9	195
0.251	13.24	1	176	E	47	1	13	S	73	29.75	20.9	N	24.3	300
0.251	13.5	1	13	S	73	1	179	E	74	13.46	110.6	E	72.9	195
0.251	13.75	1	179	E	74	1	177	E	58	16.1	0.7	N	5.9	95
0.251	14.5	1	180	E	60	1	141	NE	14	49.61	5.8	N	10	102
0.251	14.75	1	141	NE	14	1	164	E	29	16.94	0.7	N	9	272
0.251	23.29	1	155	NE	44	2	143.8	NE	31.5	14.22	173	N	16.6	89
0.251	24.05	1	140	NE	22	1	148	NE	25	4.37	8.3	N	16.8	280
0.251	24.3	1	148	NE	25	1	155	NE	22	4.09	111	E	15.7	18
0.251	24.55	1	155	NE	22	1	153	NE	39	17.03	151	SE	1.6	241
0.251	39.12	1	160	E	25	1	157	NE	33	8.13	149.4	SE	4.9	238
0.251	39.37	1	157	NE	33	1	148	NE	30	5.57	25.8	NE	26	121
0.251	39.62	1	148	NE	30	1	133	NE	23	9.64	1.3	N	17.6	95
0.251	39.87	1	133	NE	23	2	165.5	E	24	12.86	54.6	NE	22.6	324
0.251	41.13	1	150	NE	23	1	151	NE	19	4.02	145.7	SE	1.8	55
0.251	41.88	1	155	NE	26	1	156	NE	18	8.01	153	SE	1	63
0.251	42.13	1	156	NE	18	1	152	NE	22	4.23	136.2	SE	6.3	225
0.251	42.38	1	152	NE	22	1	153	NE	26	4.02	157.8	N	2.3	248
0.251	42.63	1	153	NE	26	1	151	NE	24	2.17	173	N	9.5	85
0.251	42.88	1	151	NE	24	2	153.5	NE	23	1.42	109.6	E	16.4	17
0.251	43.14	2	153.5	NE	23	2	156.6	NE	22.3	1.37	96.4	E	19.6	5
0.251	43.89	1	152	NE	22	1	147	NE	23	2.16	89	E	19.8	177
0.251	55.19	1	170	E	32	5	153.9	NE	35.1	9.4	94.4	E	31.2	182
0.251	55.44	5	153.9	NE	35.1	4	157.1	NE	29.7	5.63	140.2	SE	9.4	48
0.251	55.7	4	157.1	NE	29.7	4	159.4	E	25.1	4.76	146.9	SE	5.8	55
0.251	55.95	4	159.4	E	25.1	5	141.7	NE	27.6	8.18	80	E	24.7	169
0.251	56.2	5	141.7	NE	27.6	3	152.7	NE	35.8	10.05	178.1	N	17.2	272
0.316	0.2	2	177.6	E	38.4	3	165.4	E	31.6	9.79	31.8	NE	24	129
0.316	0.52	3	165.4	E	31.6	2	165.3	E	33.5	1.89	164.1	S	0.8	254
0.316	0.84	2	165.3	E	33.5	1	151	NE	28	9.08	27.3	NE	23.9	122
0.316	1.15	1	151	NE	28	1	155	NE	39	11.21	162.6	N	6.1	254
0.316	2.1	1	156	NE	48	1	156	NE	29	19	156	NW	0	66
0.316	5.58	1	178	E	28	1	150	NE	30	13.61	83.4	E	27.9	174
0.316	11.59	4	168	E	29.8	4	176.8	E	38.6	10.12	17.3	N	15.7	291
0.316	11.9	4	176.8	E	38.6	3	153	NE	21.4	20.69	16.5	N	15.1	112
0.316	12.22	3	153	NE	21.4	2	174.6	E	19	7.79	92	E	18.9	1
0.316	12.54	2	174.6	E	19	1	169	E	49	30.11	166.6	S	2.8	256
0.316	12.85	1	169	E	49	1	176	E	47	5.57	112.3	E	43.9	12
0.316	13.17	1	176	E	47	1	13	S	73	29.75	20.9	N	24.3	300
0.316	13.49	1	13	S	73	1	179	E	74	13.46	110.6	E	72.9	195
0.316	13.8	1	179	E	74	1	177	E	58	16.1	0.7	N	5.9	95
0.316	14.12	1	177	E	58	1	180	E	60	3.26	32	NE	42.6	320
0.316	14.43	1	180	E	60	1	141	NE	14	49.61	5.8	N	10	102
0.316	14.75	1	141	NE	14	1	164	E	29	16.94	0.7	N	9	272
0.316	23.29	1	155	NE	44	2	143.8	NE	31.5	14.22	173	N	16.6	89
0.316	24.24	2	144.2	NE	23.4	1	155	NE	22	4.39	80.3	E	21.3	348
0.316	24.55	1	155	NE	22	1	153	NE	39	17.03	151	SE	1.6	241
0.316	24.87	1	153	NE	39	1	156	NE	30	9.16	145.6	SE	5.9	54
0.316	39.1	1	160	E	25	1	157	NE	33	8.13	149.4	SE	4.9	238
0.316	39.42	1	157	NE	33	2	141.4	NE	26.3	10.16	14.5	N	21.6	109
0.316	39.73	2	141.4	NE	26.3	1	165	E	23	10.3	83.2	E	22.8	350
0.316	40.05	1	165	E	23	1	166	E	25	2.04	176	N	4.6	267
0.316	40.36	1	166	E	25	1	153	NE	24	5.47	58	NE	23.9	150
0.316	40.68	1	153	NE	24	1	150	NE	23	1.56	19.2	N	17.8	112
0.316	41.63	1	151	NE	19	1	155	NE	26	7.16	164.5	N	4.6	255
0.316	41.95	1	155	NE	26	1	156	NE	18	8.01	153	SE	1	63
0.316	42.26	1	156	NE	18	2	152.5	NE	24	6.12	143.3	SE	4.1	233
0.316	42.58	2	152.5	NE	24	1	151	NE	24	0.63	61.9	NE	24	152
0.316	42.89	1	151	NE	24	3	151.9	NE	21.6	2.38	143.7	SE	3.3	53
0.316	43.21	3	151.9	NE	21.6	1	163	E	26	6.23	20.9	N	16.7	293
0.316	43.53	1	163	E	26	1	152	NE	22	5.99	23.2	NE	17.5	116

0.398	38.94	1	160	E	25	1	157	NE	33	8.13	149.4	SE	4.9	238
0.398	39.34	1	157	NE	33	2	141.4	NE	26.3	10.16	14.5	N	21.6	109
0.398	39.74	2	141.4	NE	26.3	2	165.5	E	24	10.43	77.2	E	24	345
0.398	40.13	2	165.5	E	24	1	153	NE	24	5.08	69.3	E	23.9	160
0.398	40.53	1	153	NE	24	1	150	NE	23	1.56	19.2	N	17.8	112
0.398	41.73	1	151	NE	19	2	155.4	NE	22	3.37	179	N	9.2	270
0.398	42.12	2	155.4	NE	22	2	152.5	NE	24	2.29	126.6	SE	11	215
0.398	42.52	2	152.5	NE	24	2	152.5	NE	24	0.02	38.5	NE	22.1	153
0.398	42.92	2	152.5	NE	24	2	150.7	NE	20.5	3.58	161.9	N	4.2	73
0.398	43.32	2	150.7	NE	20.5	2	157.9	E	23.9	4.38	10.9	N	13.6	283
0.398	43.72	2	157.9	E	23.9	1	147	NE	23	4.44	49.8	NE	22.8	141
0.398	55.26	3	165.5	E	34.9	6	151.9	NE	31.4	8.22	39.1	NE	29.3	135
0.398	55.66	6	151.9	NE	31.4	7	157.3	NE	23.5	8.21	138.9	SE	7.8	47
0.398	56.06	7	157.3	NE	23.5	6	146.2	NE	36	13.54	130.5	SE	11.1	219
0.501	0.37	3	174.4	E	35.2	4	165.2	E	33.2	5.53	54.8	NE	31.5	149
0.501	0.88	4	165.2	E	33.2	1	151	NE	28	8.85	28.5	NE	24.2	123
0.501	1.38	1	151	NE	28	2	155.5	NE	43.5	15.71	161.3	N	5.4	253
0.501	1.88	2	155.5	NE	43.5	1	156	NE	29	14.5	154.9	SE	0.6	65
0.501	5.89	1	178	E	28	1	150	NE	30	13.61	83.4	E	27.9	174
0.501	6.39	1	150	NE	30	1	149	NE	27	3.04	157.5	NW	4.3	69
0.501	11.4	2	166.7	E	28.4	6	174.5	E	36.1	8.77	15.3	N	14.5	288
0.501	11.9	6	174.5	E	36.1	5	159.9	E	20.3	17.15	8.6	N	10.1	102
0.501	12.4	5	159.9	E	20.3	1	169	E	49	29.1	173.2	N	4.9	264
0.501	12.9	1	169	E	49	2	5.6	E	59.7	17.21	34	NE	39.1	316
0.501	13.4	2	5.6	E	59.7	1	179	E	74	15.51	172.7	S	21	251
0.501	13.91	1	179	E	74	2	178.5	E	59	15.02	179.4	N	1.5	91
0.501	14.41	2	178.5	E	59	2	156.4	NE	21.2	39.92	4.9	N	10.5	101
0.501	20.42	1	131	NE	47	1	145	NE	29	19.86	116.9	SE	14.6	21
0.501	20.92	1	145	NE	29	1	179	E	15	18.41	120.7	SE	12.8	28
0.501	21.42	1	179	E	15	1	153	NE	44	31.08	143.8	SE	8.8	233
0.501	22.93	1	139	NE	12	2	150.2	NE	41.4	29.7	153.8	NW	3.1	244
0.501	23.43	2	150.2	NE	41.4	1	142	NE	24	17.92	158.5	N	7.2	71
0.501	23.93	1	142	NE	24	2	144.2	NE	23.4	1.06	86.8	E	20.1	357
0.501	24.43	2	144.2	NE	23.4	2	153.7	NE	30.5	8.24	177.7	N	13.5	270
0.501	24.93	2	153.7	NE	30.5	1	156	NE	30	1.24	91.7	E	27.5	358
0.501	38.97	1	160	E	25	1	157	NE	33	8.13	149.4	SE	4.9	238
0.501	39.47	1	157	NE	33	3	148.6	NE	24.8	9.12	176.4	N	12.2	90
0.501	39.97	3	148.6	NE	24.8	2	159.6	E	24.4	4.6	70.2	E	24.4	339
0.501	40.47	2	159.6	E	24.4	1	150	NE	23	4.09	43.8	NE	22.2	135
0.501	40.97	1	150	NE	23	1	151	NE	19	4.02	145.7	SE	1.8	55
0.501	41.47	1	151	NE	19	1	155	NE	26	7.16	164.5	N	4.6	255
0.501	41.97	1	155	NE	26	3	153.5	NE	22	4.05	162.2	N	3.5	73
0.501	42.47	3	153.5	NE	22	2	152.5	NE	24	2.04	142.9	SE	4.2	232
0.501	42.98	2	152.5	NE	24	3	155.4	NE	22.2	2.12	123.4	SE	12.2	32
0.501	43.48	3	155.4	NE	22.2	1	152	NE	22	1.3	53.7	NE	21.8	145
0.501	43.98	1	152	NE	22	1	147	NE	23	2.16	89	E	19.8	177
0.501	55.5	7	158.2	E	33.1	8	157.5	NE	28	5.15	161.3	N	2	72
0.501	56.01	8	157.5	NE	28	7	144.1	NE	31.2	7.33	90	E	26.1	177
0.631	0.43	4	171	E	33.4	3	167	E	34.6	2.55	111.1	E	29.7	198
0.631	1.06	3	167	E	34.6	2	153.3	NE	33.5	7.72	59.9	NE	33.4	153
0.631	1.69	2	153.3	NE	33.5	2	156	NE	38.5	5.26	169.1	N	10.2	262
0.631	5.48	1	178	E	28	1	150	NE	30	13.61	83.4	E	27.9	174
0.631	7.37	1	149	NE	27	1	158	E	39	12.93	172.6	N	11.5	265
0.631	11.79	6	169.1	E	33.8	7	169.8	E	24.7	9.09	167.6	S	1	77
0.631	12.42	7	169.8	E	24.7	1	169	E	49	24.28	168.5	S	0.6	258
0.631	13.05	1	169	E	49	3	4.3	E	64.4	19.98	21.5	N	31.7	303
0.631	13.68	3	4.3	E	64.4	2	178.5	E	59	7.45	25.3	NE	36.9	136
0.631	14.31	2	178.5	E	59	2	156.4	NE	21.2	39.92	4.9	N	10.5	101
0.631	21.25	1	145	NE	29	2	160	E	29	7.24	62.5	NE	28.8	332
0.631	21.88	2	160	E	29	1	139	NE	12	18.26	172	N	6.6	84
0.631	22.51	1	139	NE	12	1	155	NE	44	32.6	159.4	N	4.2	250
0.631	23.14	1	155	NE	44	2	143.8	NE	31.5	14.22	173	N	16.6	89
0.631	23.77	2	143.8	NE	31.5	2	144.2	NE	23.4	8.04	142.8	SE	0.6	53
0.631	24.4	2	144.2	NE	23.4	2	153.7	NE	30.5	8.24	177.7	N	13.5	270
0.631	25.04	2	153.7	NE	30.5	1	156	NE	30	1.24	91.7	E	27.5	358
0.631	38.92	1	160	E	25	2	152.7	NE	31.4	7.28	130.9	SE	12.8	218
0.631	39.55	2	152.7	NE	31.4	3	155.2	NE	22.9	8.57	147.2	SE	3.4	56
0.631	40.18	3	155.2	NE	22.9	1	153	NE	24	1.37	117.6	SE	14.4	206
0.631	40.81	1	153	NE	24	2	150.5	NE	21	3.15	168.4	N	6.8	80
0.631	41.44	2	150.5	NE	21	1	155	NE	26	5.32	171.1	N	7.7	262
0.631	42.07	1	155	NE	26	3	153.5	NE	22	4.05	162.2	N	3.5	73
0.631	42.7	3	153.5	NE	22	4	151.7	NE	22.2	0.73	83.5	E	20.8	169
0.631	43.33	4	151.7	NE	22.2	2	157.9	E	23.9	2.97	28.5	NE	18.9	300
0.631	43.96	2	157.9	E	23.9	1	147	NE	23	4.44	49.8	NE	22.8	141
0.631	55.32	4	160.5	E	34.4	10	155.8	NE	28.9	6.03	179.1	N	12.3	93
0.631	55.95	10	155.8	NE	28.9	8	146.8	NE	30.9	4.88	88.3	E	27	176
0.794	0.79	7	169.2	E	33.9	2	153.3	NE	33.5	8.83	67.7	E	33.4	160
0.794	1.58	2	153.3	NE	33.5	2	156	NE	38.5	5.26	169.1	N	10.2	262
0.794	5.55	1	178	E	28	1	150	NE	30	13.61	83.4	E	27.9	174

1	11.69	5	166.7	E	30.2	8	171.5	E	28.5	2.92	119.7	SE	23.1	25
1	12.69	8	171.5	E	28.5	4	1.2	E	59.9	32.07	5.7	N	7.6	277
1	13.69	4	1.2	E	59.9	3	174.7	E	45.4	15.38	10.3	N	15.2	109
1	14.69	3	174.7	E	45.4	1	164	E	29	17.57	7.2	N	12.3	102
1	15.69	1	164	E	29	1	154	NE	50	21.88	145.5	SE	10	233
1	19.69	1	151	NE	26	1	131	NE	47	23.9	115.8	SE	15.7	203
1	20.69	1	131	NE	47	2	156.7	NE	21.2	29.05	117.9	SE	13.7	22
1	21.69	2	156.7	NE	21.2	2	149.8	NE	27.9	7.25	131.8	SE	9.3	220
1	22.69	2	149.8	NE	27.9	3	148.3	NE	35.6	7.76	144.1	SE	3	233
1	23.69	3	148.3	NE	35.6	3	147.7	NE	22.9	12.72	149.2	NW	0.6	59
1	24.69	3	147.7	NE	22.9	2	154.3	NE	34.5	12.02	164.7	N	7	256
1	29.69	1	151	NE	44	1	152	NE	36	8.03	148	SE	2.9	57
1	36.69	1	152	NE	22	1	158	E	23	2.5	39.8	NE	20.5	311
1	39.69	4	150.3	NE	27.4	3	161.4	E	23.9	5.93	104.8	E	20.3	11
1	40.69	3	161.4	E	23.9	2	150.5	NE	21	5.05	29.1	NE	18.2	122
1	41.69	2	150.5	NE	21	4	153.9	NE	23	2.38	3.2	N	11.7	275
1	42.69	4	153.9	NE	23	6	153.8	NE	22.8	0.24	160.5	N	2.8	75
1	43.69	6	153.8	NE	22.8	1	147	NE	23	2.67	65.9	NE	22.7	155
1	55.69	10	156.6	NE	32.6	12	150.7	NE	28.6	4.95	7.2	N	18	101
1.259	1.12	8	167.3	E	33.1	3	155.7	NE	38.7	8.8	116.8	SE	26.7	202
1.259	6.16	2	163.6	E	28.3	1	149	NE	27	6.85	54.3	NE	26.9	146
1.259	7.42	1	149	NE	27	1	158	E	39	12.93	172.6	N	11.5	265
1.259	12.45	13	169.5	E	29.2	4	1.2	E	59.9	31.68	6.8	N	9.4	279
1.259	13.71	4	1.2	E	59.9	4	172.2	E	40.1	20.9	9.7	N	14.2	108
1.259	14.97	4	172.2	E	40.1	1	154	NE	50	16.16	120	SE	33.7	203
1.259	20.01	2	138.5	NE	36.1	1	145	NE	29	7.92	119	SE	13.6	25
1.259	21.27	1	145	NE	29	3	156.3	NE	22.6	8.03	115.6	SE	15.2	22
1.259	22.52	3	156.3	NE	22.6	3	148.3	NE	35.6	13.51	137.4	SE	7.7	226
1.259	23.78	3	148.3	NE	35.6	4	149.5	NE	26.8	8.8	145.4	SE	2.1	55
1.259	25.04	4	149.5	NE	26.8	1	156	NE	30	4.42	13.2	N	19.3	286
1.259	30.08	1	151	NE	44	1	152	NE	36	8.03	148	SE	2.9	57
1.259	35.11	1	164	E	22	1	152	NE	22	4.49	68	E	21.9	158
1.259	36.37	1	152	NE	22	1	158	E	23	2.5	39.8	NE	20.5	311
1.259	37.63	1	158	E	23	1	160	E	25	2.16	179.4	N	8.8	271
1.259	38.89	1	160	E	25	5	154	NE	26.3	2.92	96.6	E	22.6	184
1.259	40.15	5	154	NE	26.3	3	151.4	NE	22	4.47	165.4	N	5.6	77
1.259	41.41	3	151.4	NE	22	4	153.9	NE	23	1.39	14.5	N	15.4	286
1.259	42.67	4	153.9	NE	23	6	153.8	NE	22.8	0.24	160.5	N	2.8	75
1.259	43.93	6	153.8	NE	22.8	1	147	NE	23	2.67	65.9	NE	22.7	155
1.259	55.26	2	168.4	E	34	20	152	NE	30.2	9.48	43.4	NE	28.9	138
1.585	1.25	8	167.3	E	33.1	3	155.7	NE	38.7	8.8	116.8	SE	26.7	202
1.585	6	2	163.6	E	28.3	1	149	NE	27	6.85	54.3	NE	26.9	146
1.585	7.59	1	149	NE	27	1	158	E	39	12.93	172.6	N	11.5	265
1.585	12.34	12	168.6	E	27.6	5	180	E	57.2	30.47	5.7	N	8.8	278
1.585	13.93	5	180	E	57.2	4	172.2	E	40.1	18.01	9.1	N	13.8	106
1.585	15.51	4	172.2	E	40.1	1	154	NE	50	16.16	120	SE	33.7	203
1.585	20.27	2	138.5	NE	36.1	3	154.7	NE	28.8	11.31	100.9	E	24	5
1.585	21.85	3	154.7	NE	28.8	3	148.7	NE	31.9	4.31	111.3	E	20.7	198
1.585	23.44	3	148.7	NE	31.9	5	148.1	NE	26.2	5.71	151.1	NW	1.5	61
1.585	25.02	5	148.1	NE	26.2	1	156	NE	30	5.3	13	N	19.1	286
1.585	29.77	1	151	NE	44	1	152	NE	36	8.03	148	SE	2.9	57
1.585	34.53	1	164	E	22	1	152	NE	22	4.49	68	E	21.9	158
1.585	36.11	1	152	NE	22	1	158	E	23	2.5	39.8	NE	20.5	311
1.585	37.7	1	158	E	23	2	158.3	E	29	5.99	159.3	N	0.6	249
1.585	39.28	2	158.3	E	29	5	153	NE	24.5	5.06	1.3	N	12.2	94
1.585	40.87	5	153	NE	24.5	6	152.8	NE	22.3	2.21	154.5	NW	0.7	65
1.585	42.45	6	152.8	NE	22.3	7	152.9	NE	22.8	0.46	154.1	NW	0.5	247
1.585	55.13	1	170	E	32	21	152.8	NE	30.5	9	60.2	NE	30.5	153
1.995	1.25	8	167.3	E	33.1	3	155.7	NE	38.7	8.8	116.8	SE	26.7	202
1.995	7.24	3	158.8	E	27.7	1	158	E	39	11.33	156.6	SE	1.1	246
1.995	13.23	15	170.1	E	31.9	6	178.4	E	52.7	21.52	5.8	N	9.6	278
1.995	15.22	6	178.4	E	52.7	1	154	NE	50	19.22	63.5	NE	50	163
1.995	21.21	3	140.5	NE	33.6	4	155.8	NE	28.4	9.37	95.5	E	25.1	0
1.995	23.2	4	155.8	NE	28.4	7	148.7	NE	28.6	3.35	65.5	NE	28.4	156
1.995	29.19	1	151	NE	44	1	152	NE	36	8.03	148	SE	2.9	57
1.995	35.17	1	164	E	22	1	152	NE	22	4.49	68	E	21.9	158
1.995	37.17	1	152	NE	22	2	159	E	24	3.4	27.3	NE	18.4	299
1.995	39.16	2	159	E	24	7	153.3	NE	25.5	2.83	101	E	20.7	189
1.995	41.16	7	153.3	NE	25.5	8	153.1	NE	22.6	2.89	154.8	NW	0.7	65
1.995	43.15	8	153.1	NE	22.6	4	153	NE	22.4	0.26	162.2	N	3.7	74
2.512	1.82	9	165.7	E	33.7	2	156	NE	38.5	7.49	117	SE	26.6	202
2.512	4.33	2	156	NE	38.5	3	158.8	E	27.7	10.92	150.7	SE	4.2	59
2.512	6.84	3	158.8	E	27.7	1	158	E	39	11.33	156.6	SE	1.1	246
2.512	9.35	1	158	E	39	7	171.5	E	32.9	9.98	117.9	SE	27.5	21
2.512	11.86	7	171.5	E	32.9	12	175.2	E	43.4	10.72	3.2	N	7.4	275
2.512	14.37	12	175.2	E	43.4	3	155.3	NE	30.6	17.4	22.7	NE	23.6	121
2.512	16.89	3	155.3	NE	30.6	1	151	NE	26	5.06	174.3	N	10.9	87
2.512	19.4	1	151	NE	26	4	146.7	NE	33.1	7.38	134.2	SE	8	222
2.512	21.91	4	146.7	NE	33.1	6	146.3	NE	27.5	5.6	148.1	NW	0.9	59

3.981	26.2	9	149.3	NE	28.4	1	151	NE	44	15.63	153.2	NW	2.1	244
3.981	30.18	1	151	NE	44	1	152	NE	36	8.03	148	SE	2.9	57
3.981	34.16	1	152	NE	36	3	158	E	22.3	14.03	144.4	SE	5.5	53
3.981	38.14	3	158	E	22.3	11	154.1	NE	24.2	2.47	120.4	SE	14	207
3.981	42.12	11	154.1	NE	24.2	9	152.8	NE	23	1.28	176.7	N	9.8	87
5.012	3.13	11	163.8	E	34.4	4	158.5	E	30.5	4.85	12.6	N	18.3	108
5.012	8.14	4	158.5	E	30.5	14	169.5	E	30.7	5.56	71.5	E	30.5	341
5.012	13.15	14	169.5	E	30.7	8	174.6	E	51	20.51	179.4	N	5.8	271
5.012	18.17	8	174.6	E	51	7	148.6	NE	30.5	26.28	14.7	N	23	115
5.012	23.18	7	148.6	NE	30.5	7	148.7	NE	28.6	1.93	146.4	SE	1.3	57
5.012	28.19	7	148.7	NE	28.6	2	151.5	NE	40	11.55	156.5	NW	4.2	248
5.012	33.2	2	151.5	NE	40	3	158	E	22.3	18.03	145.3	SE	5.1	54
5.012	38.21	3	158	E	22.3	17	153.4	NE	23.7	2.31	106.9	E	17.7	194
5.012	43.23	17	153.4	NE	23.7	3	154.4	NE	23.5	0.44	92.8	E	20.9	0
6.31	6.11	13	163.8	E	33.5	15	167.1	E	29.6	4.25	144.3	SE	12.4	51
6.31	12.42	15	167.1	E	29.6	9	173.9	E	50.7	21.47	179.7	N	7	272
6.31	18.73	9	173.9	E	50.7	13	148.1	NE	29.4	26.58	12.9	N	21.7	112
6.31	25.04	13	148.1	NE	29.4	3	152.7	NE	36.6	7.63	167	N	10.4	259
6.31	31.34	3	152.7	NE	36.6	3	158	E	22.3	14.6	146.4	SE	4.7	55
6.31	37.65	3	158	E	22.3	19	153.9	NE	23.7	2.18	110.6	E	16.8	197
6.31	43.96	19	153.9	NE	23.7	1	147	NE	23	2.82	44.2	NE	22.5	136
6.31	50.27	1	147	NE	23	22	153.7	NE	30.5	8.07	170.1	N	9.5	262
7.943	4.36	11	163.8	E	34.4	16	165.8	E	28.3	6.21	156.7	SE	4.8	65
7.943	12.3	16	165.8	E	28.3	12	168.8	E	47.2	18.94	171.8	N	3.3	263
7.943	20.25	12	168.8	E	47.2	12	150.6	NE	28.5	21.58	5.6	N	17.3	103
7.943	28.19	12	150.6	NE	28.5	4	153.9	NE	30.9	2.86	2.6	N	16	276
7.943	36.13	4	153.9	NE	30.9	21	153.7	NE	23.6	7.22	154.2	NW	0.2	65
10	8.19	15	162.5	E	33.4	22	171.5	E	37.4	6.56	34	NE	27.3	309
10	18.19	22	171.5	E	37.4	14	148.7	NE	29.5	14.75	33.7	NE	27.1	130
10	28.19	14	148.7	NE	29.5	5	154.6	NE	29.2	2.9	67.3	NE	29.2	337
10	38.19	5	154.6	NE	29.2	20	153.5	NE	23.7	5.55	158.2	N	2.1	69
10	48.19	20	153.5	NE	23.7	22	153.7	NE	30.5	6.81	154.1	NW	0.3	244
12.589	9.31	15	162.5	E	33.4	27	167.4	E	35.7	3.6	29.8	NE	25.8	305
12.589	21.9	27	167.4	E	35.7	12	150.7	NE	29.8	10.73	31.5	NE	26.5	127
12.589	34.48	12	150.7	NE	29.8	22	153.7	NE	23.6	6.35	141.3	SE	5.4	50
12.589	47.07	22	153.7	NE	23.6	22	153.7	NE	30.5	6.93	153.7	NW	0	244
15.849	12.34	27	164.9	E	30.9	24	160.9	E	36.4	5.89	144.4	SE	11.8	231
15.849	28.19	24	160.9	E	36.4	25	153.8	NE	24.8	12.18	172.5	N	8.4	85
15.849	44.04	25	153.8	NE	24.8	22	153.7	NE	30.5	5.75	153.4	SE	0.2	243
19.953	18.21	37	167.8	E	35.4	19	150.2	NE	29.4	11.11	32.1	NE	26.4	128
19.953	38.17	19	150.2	NE	29.4	42	153.6	NE	27.1	2.76	119.6	SE	16	27
25.119	15.63	36	168.3	E	35	27	151.5	NE	29.1	10.62	32.3	NE	25.9	128
25.119	40.75	27	151.5	NE	29.1	35	153.4	NE	27.4	1.94	127.4	SE	12.8	34
31.623	28.19	51	162.9	E	33.3	47	153.7	NE	27.4	7.55	12.2	N	17.8	107

Section I

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
1	39.811	36.91	5.1	47.3	140
1	31.623	21.09	7.2	29.4	123
1	25.119	24.35	6.2	53.6	146
2	31.623	52.72	7.8	148.2	58
2	25.119	49.46	3	155.5	66
2	19.953	56.86	9.5	137.3	46
2	15.849	60.68	15.6	140.4	49
2	12.589	62.08	13.7	139.2	48
2	10	56.9	10.3	135.4	44
2	10	66.9	7.7	141.9	51
2	7.943	52.79	9.7	139.8	48
2	6.31	55.83	9.8	137.5	46
2	5.012	54.45	9.8	137.5	46
2	3.981	54.82	10	150.8	61
3	19.953	16.95	6.8	16.5	110
3	15.849	13.13	5.1	3.3	95
3	12.589	11.73	4.6	172.8	84
3	10	16.91	7.3	179.6	92
3	7.943	21.02	6.5	174.5	86
3	6.31	17.98	9.1	174.7	86
3	5.012	14.35	6.6	164.3	75
3	5.012	19.36	6.6	165.9	76
3	3.981	15.01	7.9	166.7	77
3	3.981	18.99	3.9	148.6	57
3	3.162	14.77	13.3	161.1	70
3	2.512	14.3	12.4	155.3	63
6	15.849	44.83	9.4	145.1	235
6	12.589	49.49	3.5	143.6	233
6	10	46.9	14.5	137.4	227
6	7.943	44.85	14.3	145.3	235
6	6.31	43.21	14.4	149.4	239
6	5.012	44.42	14.7	141.6	231
7	12.589	24.32	4.2	83.3	173
7	10	26.91	5.5	93	182
7	7.943	28.96	5.6	91.1	179
7	6.31	30.6	4.5	69.3	159
7	5.012	29.39	1.8	79.5	167
9	10	6.91	1.5	157.9	247
9	7.943	5.13	2.9	152.4	240
9	6.31	5.36	2.5	150.2	238
9	5.012	9.34	3.4	136	222
9	3.981	11.03	4.6	159.3	249
9	3.162	8.44	2.9	3.8	276
10	10	36.91	8.1	139.1	48
10	7.943	36.91	8.1	146.4	56
10	6.31	36.91	9	150.1	60
10	5.012	39.41	7.2	128.1	37
10	3.981	38.9	11.5	145.4	56
11	7.943	68.68	7.4	142.7	52
11	6.31	68.45	7.4	142.7	52
11	5.012	69.48	7.4	142.7	52
11	3.981	66.76	7.6	156.2	66
11	3.162	68.53	6.4	153.6	64
13	6.31	24.29	3.8	139	227
13	5.012	24.38	6.5	152.9	242
13	3.981	26.95	7.2	137.7	226
13	3.162	24.26	4.7	137.3	226
13	2.512	24.35	4.3	129.5	218
13	2.512	26.86	5.5	133.5	221
15	5.012	4.33	3.8	5.2	278
15	3.981	3.07	7.1	24.3	297
15	3.162	2.12	7.7	37.8	310
15	2.512	1.74	9.3	42.7	315
15	1.995	1.99	9.3	42.7	315
21	3.981	42.88	16.4	9.2	280
21	3.162	43.23	8.1	9.4	281
21	2.512	41.93	14.8	0.2	271
21	1.995	41.89	11.7	175.4	266
22	3.981	46.86	12.9	93.8	183
22	3.162	46.39	14	100.2	189
22	2.512	46.95	23.7	79	172
22	1.995	45.88	15.4	103.5	191
22	1.585	47.21	23.7	79	172
27	3.162	11.61	5.5	160.5	249
27	2.512	11.79	9	175.9	268

53	0.794	50.01	2.6	153	245
53	0.631	49.84	9.6	152.3	243
53	0.501	49.94	9.6	152.3	243
53	0.398	50.04	6.7	167.4	262
63	1.585	40.87	14.4	55	324
63	1.259	40.05	12.2	44.2	313
63	1	39.9	6.5	24.1	294
63	0.794	40.48	12.2	44.2	313
63	0.631	41.01	16.5	64.2	333
63	0.501	40.91	16.5	64.2	333
63	0.398	40.89	12	62.9	332
63	0.316	41.02	16.5	64.2	333
63	0.251	40.92	16.5	64.2	333
63	0.2	40.9	6.3	78.9	348
63	0.158	40.87	6.3	78.4	347
63	0.158	41.03	15.3	65.5	335
63	0.126	40.87	6.3	78.4	347
63	0.126	41	15.3	65.5	335
63	0.1	40.95	9.4	90.7	360
63	0.079	40.96	9.4	90.7	360
66	1.585	70.98	15	17.1	288
66	1.259	71.53	15.4	17.6	288
66	1	70.9	11.4	17.5	288
66	0.794	71.46	13.9	19.2	290
66	0.631	71.29	13.9	19.2	290
69	1.259	7.32	7.7	172.8	84
69	1	6.91	3.9	177.7	90
69	0.794	7.12	3.9	177.7	90
69	0.631	6.93	3	161.5	71
69	0.501	7.33	10.2	169.2	80
72	1.259	17.39	5.5	169	260
72	1	17.91	8.2	147.8	237
72	0.794	18.24	4	157.2	247
72	0.631	18.29	4	157.2	247
72	0.501	17.86	8.2	147.8	237
72	0.398	17.8	8.3	144.6	233
72	0.316	17.93	8.3	144.6	233
72	0.251	17.81	8.3	144.6	233
72	0.2	17.95	8.3	144.6	233
79	1.259	47.61	15.3	12.9	110
79	1	47.9	19.2	170.6	85
79	0.794	47.63	13.2	169.2	84
79	0.631	47.95	13.3	154.4	66
79	0.501	47.93	13.3	154.4	66
79	0.398	47.65	12.5	159.7	73
79	0.316	47.66	12.5	159.7	73
79	0.251	47.71	12.2	169.7	84
79	0.2	47.68	4.2	151.8	62
79	0.2	47.88	21.4	173	87
79	0.158	47.68	7.7	145.2	54
88	1	25.91	3.5	43.8	316
88	0.794	26.18	1.9	53.8	325
88	0.631	25.86	3.5	43.8	316
88	0.501	25.88	3.7	42.2	314
88	0.398	26.16	5.1	46.8	318
88	0.316	25.84	3	22.5	295
97	0.794	22.21	18	152.9	60
97	0.631	22.08	20.6	154.5	62
97	0.501	22.37	16.1	141	45
97	0.398	22.18	16.8	151.1	58
97	0.398	22.57	3.1	165.1	75
101	0.794	36.51	4.5	165	258
101	0.631	35.96	2.7	170.3	264
101	0.501	36.4	5.5	162.8	255
101	0.398	36.51	5.5	162.8	255
109	0.631	35.33	11.8	71.7	162
109	0.501	35.4	12.9	60.7	152
109	0.398	35.31	13.2	56.1	148
109	0.316	35.32	13.8	56.3	148
109	0.251	35.4	15.3	57.9	150
124	0.398	4.66	6.9	41.3	135
124	0.316	4.65	8.1	58.3	152
124	0.251	4.75	9.1	56.7	150
130	0.398	24.56	6.1	179.3	271
130	0.316	24.57	7.8	17.5	289
130	0.251	24.6	12.4	17.3	289
130	0.2	24.53	8.9	25.2	297
143	0.316	22.99	15.4	1.5	93
143	0.251	22.84	15.4	23.1	116

204	0.158	47.84	21.4	173	87
204	0.126	47.79	19.1	179.5	94
204	0.1	47.85	19.4	169.2	83
204	0.079	47.87	19.8	171.2	85
204	0.063	47.88	19.8	171.2	85
204	0.05	47.86	19	167.6	81
211	0.126	47.67	12.8	120.1	23
211	0.1	47.65	13	116.5	18
211	0.079	47.63	13.2	135.2	42
211	0.063	47.63	14.5	114.1	15
212	0.126	47.92	6.6	46.5	316
212	0.1	47.95	10.3	23.4	293
212	0.079	47.95	10.3	23.4	293
212	0.063	47.95	10.3	23.4	293
212	0.05	47.96	13.1	29.5	298
212	0.04	47.95	13.1	29.5	298
217	0.1	24.56	3	26.3	298
217	0.079	24.59	8.5	11.9	284
217	0.063	24.6	9.4	9.1	281
217	0.05	24.6	9.4	9.1	281
217	0.04	24.58	9.4	9.1	281
217	0.032	24.59	9.4	9.1	281
223	0.1	47.75	6.5	29.3	124
223	0.079	47.79	4	16.3	111
223	0.063	47.76	6.8	25.6	121
223	0.05	47.76	6.8	25.6	121
223	0.04	47.75	6.5	16.5	112
223	0.032	47.74	5.2	23.4	119
223	0.032	47.77	2.9	28.7	122
229	0.079	24.2	9.8	166.6	77
229	0.063	24.22	9.8	166.6	77
229	0.05	24.2	15.3	164.2	74
229	0.04	24.23	9.6	170.8	81
229	0.032	24.21	17.6	168.8	79
229	0.025	24.21	15.1	167	77
245	0.05	25.5	3.6	8.9	281
245	0.05	25.55	10.6	1.7	274
245	0.04	25.58	8.7	4.9	277
245	0.032	25.57	10.6	1.7	274
245	0.025	25.56	11.1	168.3	259
272	0.025	47.72	3.9	109.7	194
272	0.02	47.72	4.3	134	220
272	0.016	47.71	4	147.8	236
272	0.013	47.71	4	147.8	236
272	0.01	47.71	4	147.8	236

Section II

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
3	19.953	32.83	5.5	131.8	220
3	15.849	30.78	7	143.1	232
3	12.589	35.44	7.9	151.5	241
3	10	27.85	3.9	140.3	230
3	10	37.85	7.6	150.6	240
3	7.943	38.74	7.9	149.3	239
8	7.943	6.97	5.9	56.3	148
8	6.31	3.93	16.2	40.4	136
8	5.012	2.81	11.1	41.6	136
8	3.981	2.95	3.1	22.4	116
8	3.162	5.46	25.8	44.1	141
8	2.512	4.02	17.4	29.1	125
8	1.995	3.9	17.4	29.1	125
8	1.995	5.9	10.4	43.8	135
8	1.585	4.63	30.4	36.8	134
8	1.585	6.21	1.2	48	136
8	1.259	4.6	27.9	61	157
8	1	4.86	26.8	70.9	164
12	6.31	10.24	12.9	51	321
12	5.012	7.82	5.5	43.4	315
12	5.012	12.83	2.7	56.8	328
12	3.981	10.91	13.8	52.2	322
13	6.31	16.55	10.9	173.3	84
13	5.012	17.84	8.9	170.2	81
13	3.981	14.89	14	164.5	74
13	3.162	14.95	19.3	148.8	56
13	2.512	16.58	19.9	141.3	49
13	1.995	15.87	20.9	134.3	40
15	6.31	29.16	6.4	154.9	245
15	5.012	27.87	7.3	175.8	267
15	3.981	26.84	8.4	155	245
15	3.162	27.6	8.4	155	245
15	2.512	29.13	18.2	132.5	221
15	1.995	29.84	18.2	132.5	221
18	3.981	18.87	14.1	125.6	214
18	3.162	18.11	11.4	126.4	215
18	2.512	19.09	14.1	125.6	214
18	1.995	19.86	13.4	130.8	220
18	1.585	18.89	14.1	125.6	214
18	1.259	18.45	6.5	127.6	216
18	1.259	19.71	9.8	124.7	213
21	3.162	2.3	10.9	32.7	307
21	2.512	1.5	14.7	18.5	291
21	1.995	1.9	14.7	18.5	291
21	1.585	1.46	11.2	16.8	289
21	1.585	3.04	7.3	40.5	316
21	1.259	0.82	12.1	41.4	314
22	3.162	8.62	15.4	77.9	345
22	2.512	9.04	12.1	92.7	359
22	1.995	9.89	14.1	72.7	341
22	1.585	10.97	10.9	52.5	324
22	1.259	10.9	10.9	52.5	324
24	3.162	33.92	15.4	31.1	124
24	2.512	34.16	15.4	31.1	124
24	1.995	33.83	12.1	35.4	127
24	1.585	33.16	11.7	36.8	129
24	1.259	33.56	12.5	33.1	126
24	1	33.85	14.5	38	130
24	0.794	33.18	10.1	39.3	132
24	0.794	33.98	8.7	21.4	113
24	0.631	33.27	13.1	44.1	137
24	0.631	33.9	3.9	24.9	116
24	0.501	33.38	15.9	42.6	136
24	0.501	33.88	3.9	24.9	116
24	0.398	34.2	9.6	20.7	113
24	0.316	34.08	9.6	20.7	113
24	0.251	34.16	9.6	20.7	113
24	0.2	34.23	44.3	8.1	103
27	2.512	14.06	10.2	103.6	191
27	1.995	11.88	7.4	122	209
27	1.995	13.88	5.5	97.3	184
27	1.585	12.55	8.5	113.5	201
27	1.585	14.14	5.5	97.3	184
27	1.259	12.15	6.3	124.1	210
27	1	11.86	12.6	122.2	209

44	0.316	7.52	20.7	18.6	285
44	0.316	7.83	15.9	36.1	306
44	0.251	7.53	20.7	18.6	285
44	0.2	7.49	20.7	18.6	285
45	1	8.86	14	136.1	45
45	0.794	8.56	6.4	145	55
45	0.631	8.66	18.5	121.5	28
45	0.501	8.82	23.2	109.1	15
45	0.398	8.72	23.2	109.1	15
66	0.631	32.63	6.9	51.5	322
66	0.501	32.88	7.2	53.3	325
66	0.398	32.61	7.4	67.8	337
66	0.316	32.5	6	60	330
66	0.316	32.82	6	50.3	323
66	0.251	32.4	8.3	52.7	322
66	0.2	32.43	8.2	35.6	307
66	0.158	32.44	8.2	35.6	307
66	0.126	32.42	9.2	39.8	311
66	0.1	32.45	8.6	35.1	307
66	0.079	32.47	8.6	35.1	307
84	0.316	32.18	7.5	90.3	179
84	0.251	32.15	10	79.5	169
84	0.2	32.23	5.9	91.2	180
84	0.158	32.13	11.1	100.7	190
84	0.126	32.17	10.8	89	178
91	0.251	32.65	1.6	133.3	42
91	0.2	32.63	3.7	138.9	46
91	0.158	32.6	3.7	138.9	46
91	0.126	32.55	1.7	123.8	30
91	0.1	32.55	1.7	123.8	30
92	0.251	32.9	9.4	36.9	309
92	0.2	32.83	5.7	36.2	309
92	0.158	32.76	2.7	46	319
92	0.158	32.92	6.2	28.3	301
92	0.126	32.8	6.8	54.5	325
93	0.251	44.71	5.2	19.7	115
93	0.2	44.6	7.9	44.2	139
93	0.158	44.65	7.7	28.3	125
93	0.126	44.63	9.1	43	139
94	0.251	44.96	5.1	131.1	38
94	0.2	45	8.1	136.6	44
94	0.158	44.96	6.8	128.2	35
94	0.126	45.01	12.1	148.3	57
97	0.2	8.29	19.2	102.2	191
97	0.158	8.19	20.6	89.3	177
97	0.126	8.25	25.4	109.1	197
97	0.1	8.26	25.4	109.1	197
101	0.2	45.2	4.7	177.7	90
101	0.158	45.28	17.1	1.7	95
101	0.126	45.26	17.6	164.8	76
102	0.2	45.4	22.2	129.9	219
102	0.158	45.44	29.2	150.9	242
102	0.126	45.52	20.3	173.8	268
102	0.1	45.45	36.7	162.4	254
102	0.079	45.41	28.7	144.1	234
102	0.079	45.49	28	166.5	260
102	0.063	45.41	28.7	144.1	234
102	0.063	45.47	28	166.5	260
102	0.05	45.38	24	131.6	222
103	0.2	45.6	17.2	107.9	11
103	0.158	45.6	19.8	127.2	30
103	0.126	45.64	17.2	142.9	50
103	0.1	45.55	12.8	154.8	67
103	0.1	45.65	12.9	138.1	44
103	0.079	45.57	12.8	154.8	67
103	0.079	45.65	12.9	138.1	44
110	0.158	45.12	7	158.1	248
110	0.126	45.14	11.9	155.2	245
110	0.1	45.15	8.7	175.5	267
110	0.079	45.18	8.7	175.5	267
110	0.063	45.16	10.5	170.8	262
110	0.05	45.13	10.5	170.8	262
119	0.126	44.76	3.5	106.4	12
119	0.1	44.75	3.2	112.5	18
119	0.079	44.78	14.8	110.5	15
119	0.063	44.78	17.7	110.2	14
119	0.05	44.78	17.7	110.2	14
119	0.04	44.77	17.7	110.2	14

Section III

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
1	31.623	28.19	7.6	12.2	107
1	25.119	15.63	10.6	32.3	128
1	19.953	18.21	11.1	32.1	128
5	15.849	44.04	5.8	153.4	243
5	12.589	47.07	6.9	153.7	244
5	10	48.19	6.8	154.1	244
8	12.589	34.48	6.4	141.3	50
8	10	38.19	5.6	158.2	69
8	7.943	36.13	7.2	154.2	65
8	6.31	31.34	14.6	146.4	55
8	5.012	33.2	18	145.3	54
8	3.981	30.18	8	148	57
8	3.981	34.16	14	144.4	53
8	3.162	31.35	19	140.3	47
8	2.512	29.45	8	148	57
8	2.512	31.96	15.1	137.8	45
8	1.995	29.19	8	148	57
8	1.585	29.77	8	148	57
8	1.259	30.08	8	148	57
8	1	29.69	8	148	57
11	7.943	12.3	18.9	171.8	263
11	6.31	12.42	21.5	179.7	272
11	5.012	13.15	20.5	179.4	271
12	7.943	20.25	21.6	5.6	103
12	6.31	18.73	26.6	12.9	112
12	5.012	18.17	26.3	14.7	115
12	3.981	14.26	13.2	31.7	129
13	7.943	28.19	2.9	2.6	276
13	6.31	25.04	7.6	167	259
13	5.012	28.19	11.6	156.5	248
13	3.981	26.2	15.6	153.2	244
13	3.162	28.19	10.3	141.6	230
13	2.512	26.93	13.8	145.7	234
19	5.012	23.18	1.9	146.4	57
19	3.981	22.22	3.2	134.5	42
19	3.162	21.87	3.3	141.6	50
19	2.512	21.91	5.6	148.1	59
24	3.981	42.12	1.3	176.7	87
24	3.162	40.84	3.3	166	78
24	2.512	39.49	4.8	163.4	74
24	1.995	41.16	2.9	154.8	65
24	1.585	40.87	2.2	154.5	65
24	1.259	40.15	4.5	165.4	77
26	3.162	12.38	23.5	2.5	274
26	2.512	11.86	10.7	3.2	275
26	1.995	13.23	21.5	5.8	278
26	1.585	12.34	30.5	5.7	278
26	1.259	12.45	31.7	6.8	279
26	1	12.69	32.1	5.7	277
26	0.794	12.7	37.1	13.9	286
26	0.631	13.05	20	21.5	303
26	0.501	12.9	17.2	34	316
26	0.398	13.06	17.2	34	316
26	0.316	13.17	29.8	20.9	300
26	0.251	13.24	29.8	20.9	300
31	2.512	1.82	7.5	117	202
31	1.995	1.25	8.8	116.8	202
31	1.585	1.25	8.8	116.8	202
31	1.259	1.12	8.8	116.8	202
31	1	1.69	4.3	140.8	227
36	1.995	21.21	9.4	95.5	0
36	1.585	20.27	11.3	100.9	5
36	1.259	20.01	7.9	119	25
36	1.259	21.27	8	115.6	22
36	1	20.69	29.1	117.9	22
36	0.794	20.64	29.1	117.9	22
41	1.585	13.93	18	9.1	106
41	1.259	13.71	20.9	9.7	108
41	1	13.69	15.4	10.3	109
41	1	14.69	17.6	7.2	102
41	0.794	14.29	44.8	3.7	100
41	0.631	13.68	7.5	25.3	136
41	0.631	14.31	39.9	4.9	101
41	0.501	13.91	15	179.4	91
41	0.398	13.86	15	179.4	91

62	0.794	55.59	4.8	5.3	99
62	0.631	55.32	6	179.1	93
62	0.501	55.5	5.2	161.3	72
62	0.398	55.66	8.2	138.9	47
62	0.316	55.54	6.6	137	44
62	0.251	55.44	5.6	140.2	48
62	0.251	55.7	4.8	146.9	55
62	0.2	55.43	4.2	145.2	53
62	0.2	55.62	6.7	139	47
62	0.158	55.61	4.1	132.2	40
62	0.126	55.63	7.2	116.1	23
63	0.794	1.58	5.3	169.1	262
63	0.631	1.69	5.3	169.1	262
63	0.501	1.38	15.7	161.3	253
63	0.398	1.12	7.5	136.5	223
63	0.398	1.52	9	158.7	250
63	0.316	1.15	11.2	162.6	254
63	0.251	1.19	11.2	162.6	254
67	0.794	23.03	23.8	152.2	242
67	0.631	22.51	32.6	159.4	250
67	0.501	22.93	29.7	153.8	244
71	0.631	11.79	9.1	167.6	77
71	0.501	11.9	17.2	8.6	102
71	0.398	11.87	16.4	4.9	97
71	0.316	11.9	20.7	16.5	112
71	0.251	11.99	23.9	2.9	94
71	0.2	11.93	25.6	17.3	112
71	0.158	11.87	10.6	38.4	136
71	0.126	11.95	26.1	15.6	111
71	0.1	11.99	23.3	171.5	82
72	0.631	12.42	24.3	168.5	258
72	0.501	12.4	29.1	173.2	264
72	0.398	12.27	28.7	3	274
72	0.316	12.54	30.1	166.6	256
72	0.251	12.24	38.9	1	271
72	0.2	12.33	40.2	1.5	272
72	0.158	12.34	56	176.6	267
72	0.126	12.33	56	176.6	267
80	0.631	41.44	5.3	171.1	262
80	0.501	41.47	7.2	164.5	255
80	0.398	41.73	3.4	179	270
80	0.316	41.63	7.2	164.5	255
84	0.501	0.37	5.5	54.8	149
84	0.398	0.32	6.5	44.7	140
84	0.316	0.2	9.8	31.8	129
84	0.251	0.18	12.6	26.8	123
84	0.2	0.16	11.4	21.8	117
84	0.158	0.14	11.4	21.8	117
84	0.126	0.24	8.9	11.4	106
84	0.1	0.19	8.9	11.4	106
88	0.501	11.4	8.8	15.3	288
88	0.398	11.47	7.3	14.1	287
88	0.316	11.59	10.1	17.3	291
90	0.501	14.41	39.9	4.9	101
90	0.398	14.26	48.4	4.4	100
90	0.316	14.43	49.6	5.8	102
90	0.251	14.5	49.6	5.8	102
94	0.501	39.47	9.1	176.4	90
94	0.398	39.34	10.2	14.5	109
94	0.316	39.42	10.2	14.5	109
94	0.251	39.37	5.6	25.8	121
94	0.251	39.62	9.6	1.3	95
95	0.501	39.97	4.6	70.2	339
95	0.398	39.74	10.4	77.2	345
95	0.316	39.73	10.3	83.2	350
97	0.501	42.47	2	142.9	232
97	0.398	42.12	2.3	126.6	215
97	0.316	42.26	6.1	143.3	233
97	0.251	42.13	4.2	136.2	225
97	0.251	42.38	4	157.8	248
97	0.2	42.26	6.1	143.3	233
97	0.158	42.14	4.2	136.2	225
97	0.158	42.3	4	157.8	248
97	0.126	42.16	4.2	136.2	225
97	0.1	42.19	4.2	136.2	225
122	0.316	56.18	18.3	162.2	254
122	0.251	56.2	10.1	178.1	272
122	0.2	56.22	12.5	8	281
134	0.251	55.19	9.4	94.4	182

160	0.063	56.08	28.7	144.1	234
160	0.063	56.14	28	166.5	260
171	0.126	56.01	18.9	21.7	116
171	0.1	55.99	25.6	10.5	104
171	0.079	55.99	34.3	176.1	88
171	0.063	56.02	34.3	176.1	88
171	0.05	55.98	34.3	176.1	88
171	0.04	56	34.3	176.1	88
172	0.126	56.26	25.6	134.4	37
172	0.1	56.29	27.1	124.6	26
172	0.079	56.31	27.1	124.6	26
172	0.063	56.27	27.8	121.1	21
172	0.05	56.28	27.8	121.1	21
172	0.04	56.28	27.8	121.1	21
183	0.1	55.69	12.1	148.3	57
183	0.079	55.67	16.7	139.4	47
183	0.063	55.7	19.5	143	50
183	0.05	55.68	19.5	143	50
184	0.1	55.79	13.9	154.7	244
184	0.079	55.83	8.7	175.5	267
184	0.063	55.83	10.5	170.8	262

Section I

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
1	31.623	21.09	7.2	29.4	123
2	10	56.9	10.3	135.4	44
2	10	66.9	7.7	141.9	51
3	3.162	14.77	13.3	161.1	70
6	5.012	44.42	14.7	141.6	231
7	7.943	28.96	5.6	91.1	179
9	3.981	11.03	4.6	159.3	249
10	3.981	38.9	11.5	145.4	56
11	3.981	66.76	7.6	156.2	66
13	2.512	24.35	4.3	129.5	218
13	2.512	26.86	5.5	133.5	221
15	1.995	1.99	9.3	42.7	315
21	3.981	42.88	16.4	9.2	280
22	1.585	47.21	23.7	79	172
27	1.995	11.96	12.7	175.1	267
34	1.585	6	5.3	25.2	120
43	1.585	7.58	17.7	15.9	289
48	0.631	24.6	10.6	4.2	276
49	0.794	34.92	6.2	111.2	200
49	0.794	35.71	5.3	88.3	175
53	1	48.9	15.8	174.8	266
53	1	49.9	2.6	153.7	246
63	0.158	40.87	6.3	78.4	347
63	0.158	41.03	15.3	65.5	335
66	1.259	71.53	15.4	17.6	288
69	0.501	7.33	10.2	169.2	80
72	0.2	17.95	8.3	144.6	233
79	0.2	47.68	4.2	151.8	62
79	0.2	47.88	21.4	173	87
88	0.398	26.16	5.1	46.8	318
97	0.631	22.08	20.6	154.5	62
101	0.398	36.51	5.5	162.8	255
109	0.251	35.4	15.3	57.9	150
124	0.251	4.75	9.1	56.7	150
130	0.251	24.6	12.4	17.3	289
143	0.126	22.87	25.5	20.3	115
144	0.2	24.33	7.1	66	156
152	0.2	6.78	9.4	6.8	100
157	0.2	25.73	10.2	9.3	103
193	0.158	24.23	11.4	176.1	87
194	0.079	24.35	14.3	142.6	233
195	0.126	24.5	9.9	67.7	336
204	0.158	47.84	21.4	173	87
211	0.063	47.63	14.5	114.1	15
212	0.04	47.95	13.1	29.5	298
217	0.032	24.59	9.4	9.1	281
223	0.032	47.74	5.2	23.4	119
223	0.032	47.77	2.9	28.7	122
229	0.032	24.21	17.6	168.8	79
245	0.05	25.5	3.6	8.9	281
245	0.05	25.55	10.6	1.7	274
272	0.02	47.72	4.3	134	220

Section III

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
1	19.953	18.21	11.1	32.1	128
5	12.589	47.07	6.9	153.7	244
8	2.512	29.45	8	148	57
8	2.512	31.96	15.1	137.8	45
11	6.31	12.42	21.5	179.7	272
12	6.31	18.73	26.6	12.9	112
13	3.981	26.2	15.6	153.2	244
19	2.512	21.91	5.6	148.1	59
24	2.512	39.49	4.8	163.4	74
26	0.794	12.7	37.1	13.9	286
31	1.259	1.12	8.8	116.8	202
36	0.794	20.64	29.1	117.9	22
41	0.631	13.68	7.5	25.3	136
41	0.631	14.31	39.9	4.9	101
44	0.398	23.41	17.9	158.5	71
49	0.794	21.44	22.9	150.5	240
52	0.398	43.72	4.4	49.8	141
53	0.794	0.79	8.8	67.7	160
62	0.2	55.43	4.2	145.2	53
62	0.2	55.62	6.7	139	47
63	0.398	1.12	7.5	136.5	223
63	0.398	1.52	9	158.7	250
67	0.631	22.51	32.6	159.4	250
71	0.2	11.93	25.6	17.3	112
72	0.126	12.33	56	176.6	267
80	0.316	41.63	7.2	164.5	255
84	0.251	0.18	12.6	26.8	123
88	0.316	11.59	10.1	17.3	291
90	0.251	14.5	49.6	5.8	102
94	0.316	39.42	10.2	14.5	109
95	0.398	39.74	10.4	77.2	345
97	0.158	42.14	4.2	136.2	225
97	0.158	42.3	4	157.8	248
122	0.316	56.18	18.3	162.2	254
134	0.079	55.28	10.9	48.6	143
137	0.1	0.59	8.3	13.8	109
141	0.158	12.02	16.9	178.7	91
141	0.158	12.18	26.4	163.6	74
146	0.158	42.93	2	163.7	75
146	0.158	43.09	3.5	179.2	91
160	0.063	56.08	28.7	144.1	234
160	0.063	56.14	28	166.5	260
171	0.04	56	34.3	176.1	88
172	0.04	56.28	27.8	121.1	21
183	0.05	55.68	19.5	143	50
184	0.1	55.79	13.9	154.7	244

Section II

Tilt number	window size (m)	elevation (m)	tilt angle (°)	tilt axis (°)	tilt way (°)
3	10	27.85	3.9	140.3	230
3	10	37.85	7.6	150.6	240
8	1.585	4.63	30.4	36.8	134
8	1.585	6.21	1.2	48	136
12	3.981	10.91	13.8	52.2	322
13	1.995	15.87	20.9	134.3	40
15	1.995	29.84	18.2	132.5	221
18	1.259	18.45	6.5	127.6	216
18	1.259	19.71	9.8	124.7	213
21	1.585	1.46	11.2	16.8	289
21	1.585	3.04	7.3	40.5	316
22	3.162	8.62	15.4	77.9	345
24	0.2	34.23	44.3	8.1	103
27	1.585	12.55	8.5	113.5	201
27	1.585	14.14	5.5	97.3	184